Metal detector survey of the East Cemetery, Aska in Hagebyhöga, Östergötland

Report on fieldwork in September 2020. Listed ancient monument L2009:9662 = Raä 79. Vadstena kommun. Lst dnr 431-6367-20.

By Martin Rundkvist & Julia Schulte Koskinen, 26 January 2021

Background & results

The East Cemetery at Aska came to the attention of archaeology in 2006, when a metal detector survey directed by Rundkvist located a cluster of later Middle Viking Period jewellery in the open field south-east of the Aska platform mound (Rundkvist 2011:93, 97).

The oldest plan of the site is found on a 1688 *geometrisk avmätning* map. At that time, much of the site had already been ploughed over, and the map shows a long narrow field impediment along a road. A 1767 *storskifte* map shows seven impediments, and an 1861 *laga skifte* map shows none. After the *laga skifte* land reform, the road was ploughed out. But one field impediment survived until the 1950s, judging from oral tradition and an aerial photograph kept by the Karlsson family who live next to the site.

The Karlssons were very kind and supportive during the 2020 fieldwork on the platform mound and on the cemetery site under discussion here. On 12 September, Rundkvist directed 70.2 person hours of metal detecting across the assumed extent of the cemetery, as deduced from where finds were made in 2006. The team made rich finds and expanded the cluster mainly towards the north and north-east. One undisturbed furnished inhumation grave was seen in a little detector pit and left for future excavation.

The oldest find is a piece of a brooch from c. 750-840. But as expected, the site mainly yielded additional fragmented copper-alloy jewellery from the later Middle Viking Period c. AD 940-1000. None of the finds show any damage from the cremation pyre. The extant burial encountered during fieldwork is an inhumation.

As for finds from the period AD 1000-1600, the team found a small assortment of everyday objects. Only two stand out for their quality and early dates: a rare Late Viking Period spur fitting and a gilded finger ring of 12th century date.

Thanks to Tobias Bondesson, Ny Björn Gustafsson and Yngve Karlsson for help with classifying several finds! And to Göran Thorén for information about the 1885 cairn!

50-metre grid in RT90. Plan by Jon Lundin.

Methodology

Rundkvist divided the area into eight 50-metre squares on the RT90 grid and recorded how many person-hours of metal detecting were done in each. The ground conditions were excellent, recently ploughed and harrowed, but heavy rain in the afternoon hampered work. The average search intensity was 9.2 person-hours per 2500 sqm or 3.7 person-hours per 1000 sqm. All finds were pinpointed with a hand-held hiking GPS. The detectorists avoided digging on iron signals. The team reburied most of what Rundkvist could not date and everything he could date to after 1600.

Sq	Finds	Person hours	Area sqm	Finds / hr / 10,000 sqm	Pers hrs / 2500 sqm
BA	5	8.5	2500	2.4	8.5
BB	1	7.5	1786	0.7	10.5
BC	0	14.0	2222	0.0	15.8
BD	12	12.0	2500	4.0	12.0
BE	5	7.3	2500	2.7	7.3
BF	6	8.5	2500	2.8	8.5
BG	0	7.3	2500	0.0	7.3
BH	3	5.0	2500	2.4	5.0
Sum		70.1	19008		

An extant burial

Already the finds made in 2006 suggested that the site is a ploughed-out cemetery. This was confirmed when detectorist Patrik Svantesson dug on a strong signal in sq BD and encountered two pieces of the base shell from a Middle Viking Period tortoise brooch. These he lifted, and then he uncovered some bones and other pieces of metalwork that he left undisturbed. The brooch shell was replaced and the pit was back-filled.

The pit’s coordinates were SWEREF 99 TM: 6478863, 498872 -- RT90: 6481120, 1451859. The depth was 25 cm and the farmer reported that he ploughs to 17 cm depth. This calls for a speedy rescue excavation.

Finds

Early and Middle Viking Period 790-1000

The oldest datable find is part of the openwork dome on top of the disc from a Late Vendel or Early Viking Period disc-on-bow brooch, c. 750-840. It was in the main find cluster, in sq BD. There is then a gap of a century or more before the main phase of late Middle Viking Period burial begins after c. AD 940.

It was known since 2006 that this phase at the site is characterised by unburnt jewellery. The new finds are more of the same, fragmented P52 tortoise brooches and a crown-shaped finial from an equal-armed brooch. Less usual is a continental fitting in the shape of a mammal's head that has been converted into a brooch. N.B. Gustafsson has pointed to parallels in period manuscript art. Two pieces of silver dirham coins have yet to undergo detailed study. Y. Karlsson believes however that one is a Samanid and suggests that it may have been struck for Ismail b. Ahmad 279-295 H = AD 892-908. The other might be a dirham imitation. There are no male dress accessories, unless a few nondescript belt fittings belong to this phase. They are difficult to date.

P52 is not one of the earlier double-shelled tortoise brooch types. There are in fact no finds from the earlier half of the Middle Viking Period, nor from the phase's final quarter when type P48 tortoise brooches were fashionable. This suggests that the cemetery was used quite briefly, for only 30-40 years from c. AD 940 to 975. In all likelihood it was terminated by conversion to Christianity. Fivelstad church is clearly visible across the fields to the south-east. Three pieces of inscribed early Christian burial monuments found at the church demonstrate that the current stone structure was preceded by a wooden church during the 11th century.

After AD 1000

Signs of activity at the cemetery continue into the Ringerike phase after AD 1000 in the shape of a basket-shaped spur finial from the Late Viking Period. At this late date, this elite male attribute is unlikely to represent furnished burial. Indeed, it was found alone in sq BB between the cemetery cluster and the Aska platform mound. A gilded twisted copper-alloy finger ring is likely to date from the 1100s. A few nondescript later or undateable objects were also collected, of which the latest is a silver *hwid* coin struck for Christan I of Denmark in 1448-81. Two small unreadable silver coins may prove to be even later than the *hwid* when legible after conservation.

Not the site of the rich 1885 burial

An extremely rich Early Viking Period weapon burial under a cairn was found at Aska in 1885, at an unspecified distance due east of the platform mound. Rundkvist has suggested (2011:92) that this might have been the site investigated for this report. This identification was first questioned by Schulte Koskinen in a term paper, who instead suggested a location further east. Local historian and genealogist Göran Thorén then verified this conclusion, citing period newspaper reports and the property registry.

The 1885 cairn was on land that belonged to Östergården farmstead and was owned by one Gustaf Olsson. (He is the maternal grandfather of the maternal grandfather of the current landowners, the Rehn brothers.) There has been some confusion, because Olsson lived at Mellangården farmstead, yet owned some land under Östergården. The only plot that fulfils these parameters is around the smallholding Rosenlund, 400 m east of the platform mound's eastern end.

No field monuments survive here today. But Carl Fredrik Nordenskjöld (1875) described a large ancient cairn cemetery that had been flattened when the Östergården farmstead moved to a low hill immediately east of Rosenlund after the 1861 *laga skifte* land reform. These cairns contained inhumations and urned cremations. The site is registered as Raä Hagebyhöga 44 = L2009:7907. It appears that the richly furnished cairn demolished on Gustaf Olsson's land in 1885 would have been on the west edge of the Östergården cemetery, which had in turn been mostly destroyed over 20 years previously.

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Administrativia

County admin case number	431-6367-20
Municipality	Vadstena
Location	Aska in Hagebyhöga
Property	Aska 8:15
Site number	L2009:9662 = Raä 79
Site type	Ploughed-out cemetery
Type of fieldwork	Metal detector survey
Rationale	Research and outreach
Project director	Martin Rundkvist
Permit keeper	Östergötlands Läns Museum
County case administrator	Malin Svarvar
Fieldwork period	12 September 2020
Archiving	The documentation was compact and was transferred to digital media during fieldwork. There is nothing to archive in addition to this report.

Participants

Ahlstrand Uffe
Ancker Johan
Blomqvist Micke
Hed Martin Gunnar
Lander Michael
Leverin Frank
Lindberg Håkan
Lindelöf Magnus
Lärk Kenth
Orell Aarno
Södergren Olle
Svantesson Patrik
Tibell Anna-Lena
Westerberg Mattias
Österblad Magnus

2020 finds list

Fno	Mtrl	Object	Spec	Weight	x	y	Date	Finder
201	Cu	Fitting		2.6	6481105	1451929	?	MGH
202	Cu	Spur fitting		13.2	6481168	1451833	VIK3	Olle
203	Cu	Ring	Twisted, gilded	3.8	6481063	1451824	MED	
204	Cu	Brooch	Horse head	13.4	6481152	1451862	VIK2	
205	Pb	Spindle whorl		8.7	6481125	1451947	VIK-MED	
206	Cu	Tortoise brooch	P52 top shell	11.4	6481137	1451887	VIK2	MGH
207	Cu	Tortoise brooch	P52 base shell	5.6	6481096	1451885	VIK2	M Lander
208	Ag	Coin	Dirham Samanid	0.6	6481135	1451897	VIK2 (892-908?)	
209	Ag	Coin	Dirham imitation?	1.1	6481162	1451885	VIK2	Olle
210	Ag	Coin	Christian I, hwid	0.6	6481161	1451896	MED 1448-81	MGH
211	Cu	Disc	Decorated, gilded	1.1	6481115	1451930	MOD	Frank
212	Ag	Coin	?	0.7	6481095	1451839	MOD?	MÖ
213	Ag	Coin	?	0.8	6481130	1451884	MOD?	Erik
214	Cu	Tortoise brooch?	Base shell?	0.9	6481124	1451856	VIK?	
215	Cu	Tortoise brooch	P52 base shell	1.7	6481095	1451815	VIK2	
216	Cu	Tortoise brooch?	Top shell?	1.0	6481106	1451874	VIK2?	Erik
217	Cu	Tortoise brooch?	Top shell?	1.1	6481106	1451892	VIK2?	M Lander
218	Cu	Disc	Embossed bumps	5.7	6481065	1451839	?	
219	Flint	Chip		1.4	6481168	1451896	?	
220		*Discarded*						
221	Cu	Equal-armed brooch	Crown finial	5.1	6481134	1451951	VIK2	Frank
222	Cu	Sheet	Punched	1.2	6481086	1451801	VIK-MED	
223	Cu	Tortoise brooch	P52 base shell	12.2	6481064	1451854	VIK2	Uffe
224	Cu	Tortoise brooch	Base shell	4.2	6481083	1451890	VIK2	
225	Cu	Knob		7.5	6481097	1451885	?	Erik
226	Cu	?	Openwork relief	2.7	6481190	1451896	?	
227	Cu	Tortoise brooch	P52 top shell	4.3	6481099	1451874	VIK2	Frank
228	Cu	Strap end	With leather	3.3	6481094	1451896	VIK-MED	
229	Cu	?	Embossed relief	0.3	6481139	1451880	?	MGH
230	Cu	Double fitting	With leather	2.5	6481069	1451866	VIK-MED	Uffe
231	Cu	Tortoise brooch	Top shell	1.7	6481139	1451884	VIK2	MGH
232	Cu	?	Relief	0.5	6481135	1451867	?	MGH
233	Cu	?	Openwork relief	2.9	6481101	1451870	?	
234	Cu	Disc-on-bow brooch		3.5	6481114	1451881	VIK1	Frank
235	Cu	Strap fitting	Punched	1.2	6481117	1451871	MED	
		Grave			6481120	1451859	VIK2	

2006 finds list

These finds are not part of the case reported on here, but are included in this report to collect all the site data in one place.

Fno	Mtrl	Object	Spec	x	y	Dat
2006:19	Cu	Disc brooch		1451863	6481102	VIK2
2006:20	Cu	Disc brooch		1451842	6481129	VIK2
2006:21	Cu	Tortoise brooch	Gilded decoration	1451842	6481134	VIK2
2006:22	Cu	Tortoise brooch	P52 crown finial	1451868	6481101	VIK2
2006:23	Cu	Brooch	Pin hinge	1451873	6481095	VIK
2006:24	Cu	Tortoise brooch	P52 top shell	1451855	6481129	VIK2
2006:25	Cu	Tortoise brooch	P52 top shell	1451874	6481100	VIK2
2006:26	Cu	Jewellery chain		1451780	6481254	VIK
2006:27	Cu	Tortoise brooch	P52 base shell (fit)	1451868	6481098	VIK2
2006:28	Cu	Tortoise brooch	P52 base shell (fit)	1451877	6481087	VIK2
2006:29	Ag	Filigree bead		1451861	6481098	VIK2

2020 finds photographs

Aska ÖGRF 2020
F209-216

Aska ÖGRF 2020
F209-216

Aska ÖGRF 2020
F217 - 224

Aska ÖGRF 2020
F217 - 224

Aska ÖGRF 2020
F225-230

Aska ÖGRF 2020
F225-230

F231-235
Aska ÖGRF 2020

F231-235
Aska ÖGRF 2020

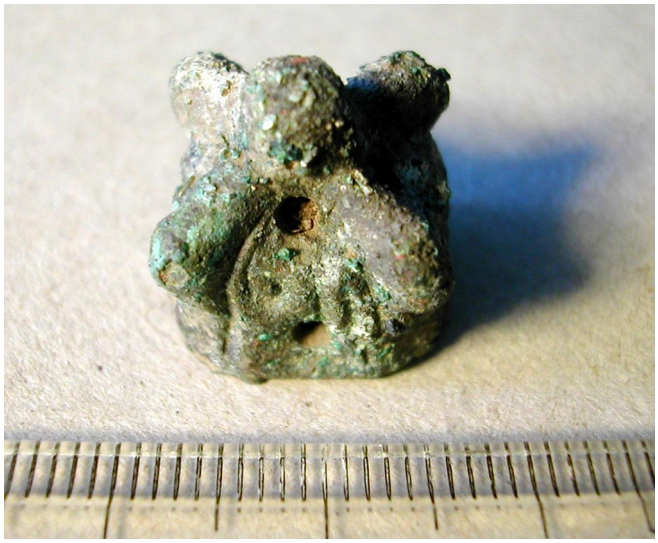
2006 finds photographs

These finds are not part of the case reported on here, but are included in this report to collect all the site data in one place.

F2006:19 after conservation. Diam 64 mm.

F2006:20 before conservation. Diam 38 mm.

F2006:21



F2006:22

F2006:24-25

F2006:26

F2006:27

F2006:29

F2006:28 top & bottom, F2006:27, pin hinge F2006:23

The 1767 storskifte map

The east cemetery on the *storskifte* map of 1767. Note the platform mound “Aska Hög” and the group of green field impediments at no. 3.

2022/2023

CONSERVATION WORK REPORT

Aska East

Find no: 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235

dr Magdalena Majorek, dr inż. Artur Ginter
PRACOWNIA DATOWANIA I KONSERWACJI ZABYTKÓW, IA UŁ;
LABORATORY OF LUMINESCENCE DATING AND CONSERVATION OF ARTIFACTS; IA UŁ

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7.21. Sheet, find no. 222 53
7.22. Tortoise brooch, find no. 223 55
7.23. Tortoise brooch, find no. 224 57
7.24. Knob, find no. 225 58
7.25. Unidentified, find no. 226 60
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1. General information

The number of Item	**34**	
Inv . No.	201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235	
Site	Aska East	
The author of the work program	Magdalena Majorek [PhD]	
The author of conservation	Magdalena Majorek [PhD]	
Specialist analyzes	XRF spectrometry	microscopic photo
Author of specialist analyzes	Artur Ginter [PhD Eng.]	Magdalena Majorek [PhD]
Principal	Martin Rundkvist [assoc. res. prof.]	
The Contractor	**University of Lodz** **Institute of Archaeology** **Laboratory of Luminescence Dating and Conservation of Artifacts** ul. Narutowicza 65 90-131 Lodz	
Place where documentation is stored	Martin Rundkvist	University of Lodz Institute of Archaeology Laboratory of Luminescence Dating and Conservation of Artifacts; ul. Narutowicza 65; 90-131 Lodz

2. State of preservation

The artifact was handed over to the Laboratory of Luminescence Dating and Conservation of Artifacts for conservation works. No previous conservation work had been carried out on these items before.

2.1. Non-ferrous metal alloys (Cu alloys)

Inw. no. 201. 202, 203, 204, 206, 207, 211, 214, 215, 216, 217, 218, 221, 222, 223, 224, 225, 227, 228, 229, 230, 231, 232, 233, 235 - in organoleptic evaluation - good state of preservation, visible gray-brown-green surface corrosion products, by microscopic evaluation - visible gray-brown-green corrosion products, products of surface corrosion equal in thickness plus pitting corrosion occurs.

2.2. Non-ferrous metal alloys (Ag and Au alloys)

Inw. no. 203, 208, 209, 210, 211, 212, 213 - in organoleptic evaluation - poor/good state of preservation. In the case of coins, thick soil and corrosion layers were visible on their surfaces, obscuring the obverse and reverse of the coin.

2.3. Non-ferrous metal alloys (Pb, Sn, Zn alloys)

Inw. no. 205, 226, 234 - in organoleptic evaluation - very good state of preservation.

2.4. Ferrous metal alloys (Fe alloys)

Inw. no. 204 - in the organoleptic assessment, the iron elements are characterized by a very poor state of preservation, no preserved core, very thick corrosion layers.

3. Specialist analyzes

- Microscopic analyzes using the DELTA OPTICAL microscope, Model SZ-630T (magnification: 0.8 x 10; 2.0 x 10) - inw. no: 204 (the surface of the artefact was checked before and after removal of corrosion layers; the type of corrosion was checked);
- Microscopic analyzes using the Nikon Eclipse LV 150 N microscope (50x magnification) - inw. no: 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 218, 219, 222, 231, 232, 234, 235.
- Spectrometry XRF - measurements were made using POLON-IZOT XRF PI-MKON 0.1.XRF 01 spectrometer using dedicated Spc and SpcArcheo software. The device was equipped with an X-ray lamp (4W, 50kV, 132 µA) and a tungsten anode. The measurements were performed with the following lamp parameters: 25 kV and 5 µA, with 300s of accumulation time (the software mentioned normalises all results to 100s regardless of the accumulation duration). Tungsten and tantalum peaks visible on the spectra are Rayleigh scattering peaks connected with the tungsten anode used, and so they are not elements of the artefact studied. Argon is the basic component of the air present between the lamp and the artefact during the measurement. The spectrogram created as described above was processed using a Savitzky-Golay smoothing filter and background subtraction using the Peak Stripping method.

4. Conservation work program

The program of conservation works included cleaning, stabilization of corrosion processes and application of protective coatings, as well as preparing it for exhibition purposes or safe storage in

constant humidity and temperature conditions. First, the photographic (micro and macroscopic) and measurement documentation of the monument was made. The next stage was cleaning the object of corrosion layers and rinsing out harmful compounds. In order to protect against corrosion, chemical agents that are corrosion inhibitors were used, the object was drained and protective layers were applied. As part of the last stage, a photographic and measurement documentation was made and a report on the conservation works was prepared.

5. Conservation process

5. 1. Procedure no. 1 - for copper metal alloys

- Rinsing in distilled water.
- Mechanical removal of corrosion layers with the use of hand brushes and brushes with very soft and soft synthetic bristles such as natural and with the use of: Micro-grinders Urawa UC 500 with the use of brushes with very soft and soft bristles made of synthetic and natural fibers, an ultrasonic cleaner and a micro sandblasting machine Abrasil B10001 at pressures up to 1 Bar and 0.8 mm diameter tip (only compressed **air** was used).
- The object, cleared of soil layers, was bathed in a 3% aqueous solution of di-sodium edetate and rinsed for 5 minutes. Bathing repeated several times.
- Bath in distilled water heated continuously to a temperature of 100 ° C.
- After cleaning, the object was subjected to an acetone bath to remove the water.
- After dehydration and evaporation of acetone, the surface was polished with a micro-grinder, using soft polishing brushes and polishing rubber without additional abrasive substances, and wiped with a cotton cloth.
- The stabilization process involved placing the artifact in a bath in 3% alcohol (high-percentage - 99.8%) benzotriazole [BTA] (corrosion inhibitor) solution. Slow and controlled process of alcohol evaporation was carried out.

Protective layer:

- 10% Paraloid B-44 acrylic resin dissolved in toluene / xylene was applied.

5. 2. Procedure no. 2 - for silver and gold metal alloys

- Rinsing in distilled water.
- Mechanical removal of corrosion layers with the use of hand brushes and brushes with very soft and soft synthetic bristles such as natural and with the use of: Micro-grinders Urawa UC 500 with the use of brushes with very soft and soft bristles made of synthetic and natural fibers, an ultrasonic cleaner and a micro sandblasting machine Abrasil B10001 at pressures up to 1 Bar and 0.8 mm diameter tip (only compressed **air** was used).

- The object, cleared of soil layers, was bathed in a 3% aqueous solution of di-sodium edetate and rinsed for 5 minutes. Bathing repeated several times.
- After cleaning, the object was subjected to an acetone bath to remove the water.
- After dehydration and evaporation of acetone, the surface was polished with a micro-grinder, using soft polishing brushes and polishing rubber without additional abrasive substances, and wiped with a cotton cloth.

Protective layer:

- 10% Paraloid B-44 acrylic resin dissolved in toluene / xylene was applied.

5. 3. Procedure no. 3 - for lead/tin/zinc alloys

- Rinsing in distilled water.
- Mechanical removal of corrosion layers with the use of hand brushes and brushes with very soft and soft synthetic bristles such as natural and with the use of: Micro-grinders Urawa UC 500 with the use of brushes with very soft and soft bristles made of synthetic and natural fibers, an ultrasonic cleaner and a micro sandblasting machine Abrasil B10001 at pressures up to 1 Bar and 0.8 mm diameter tip (only compressed **air** was used).
- Cleaned of loose corrosion layers and possibly previously unremoved soil layers, the object was immersed in a bath: in a 3% solution of tri-ammonium citrate dissolved in water at 25°C in an ultrasonic cleaner for 1 to 5 minutes (the object was bathed in a minimum of three cycles with each time changing the solution to a new one).
- After cleaning, the object was subjected to an acetone bath to remove the water.
- After dehydration and evaporation of acetone, the surface was polished with a micro-grinder, using soft polishing brushes and polishing rubber without additional abrasive substances, and wiped with a cotton cloth.
- The stabilization process involved placing the artifact in a bath in 3% alcohol (high-percentage - 99.8%) benzotriazole [BTA] (corrosion inhibitor) solution. Slow and controlled process of alcohol evaporation was carried out.

Protective layer:

- 10% Paraloid B-44 acrylic resin dissolved in toluene / xylene was applied.

5. 4. Procedure no. 4 - for ferrous metal alloys

- Rinsing in distilled water (softening of soil and corrosion layers).
- Mechanical removal of soil and corosion layers with hand brushes, polishing stones and brushes with very hard and hard bristles (steel, plastic) and with the Urawa UC 500 Micro Drill using: - brushes of various hardness made of synthetic and natural fibers, - polishing

rubbers - Abrasil B10001 micro sand blasting machines at pressures up to 3 Bar and a tip with a diameter of 0.8 mm (glass was used).

- Baths in an aqueous solution of citric acid (maximum 5%; 15-120 minutes).
- Rinsing in distilled water at 40°C in an ultrasonic cleaner in several 15-minute cycles with each water change.
- Cleaning the surface using brushes with metal bristles, as well as delicate wooden and plastic spatulas and a scalpel to undermine and crush corrosion layers as well as diamond drills.
- Bathing in a 3% solution of disodium edetate (EDTA) dissolved in distilled water in 5-10-minute cycles in an ultrasonic cleaner. The procedure was repeated several times, each time changing the fluid.
- Processes above were repeated many times.
- Bathing in distilled water heated continuously to 100°C.
- After cleaning, the object was bathed in acetone to remove water.
- After dehydration and evaporation of the acetone, the surface was cleaned with a metal bristle brush.

Stabilization process:

- Corrosion layers were passivated in baths in a 2 to 10% solution of tannin in alcohol.
- After evaporation of the solvent, the excess of precipitated tannin compounds and corrosion layers were removed mechanically and the surface was polished.

Protective layer:

- 10% Paraloid B72 acrylic resin dissolved in toluene / xylene was applied.

6. Recommendations for preventive care

The artifact should be stored in constant conditions:

- temperature (18-23 ° C),
- humidity (absolute maximum humidity should not exceed 40%).

The object should be protected against dust and weather conditions, including UV rays or water. Cleaning should be carried out with particular care, using linen or cotton material.

The item should be protected against mechanical damage, stored individually with the use of string bags. For storage, it is best to use acid-free cardboard boxes and additional materials that insulate from other items or packaging materials by using, for example, bubble wrap.

Do not touch objects directly with your hands. It is recommended to remove items with clean rubber (latex / nitrile / vinyl) or cotton gloves, with extreme caution. All activities should be performed in a clean space with constant temperature and humidity conditions.

Do not leave unprotected objects in the air.

Transport only in properly prepared and secured containers, in which the archaeological object should be placed in a stable manner, without the possibility of moving inside the container.

7. Item description and photographic documentation

7.1. Fitting, find no. 201

Item	Fitting
Inv . No.	201
Site	Aska East Cemetery 2020
Dimensions [mm]	3.44 x 2.08 x 0.09 (plate thickness)
Weight [g]	2,412
Raw material	Cu alloy
Procedure	no. 1

Figure 1. Fitting, find no. 201, before conservation

Figure 2. Fitting, find no. 201, after conservation

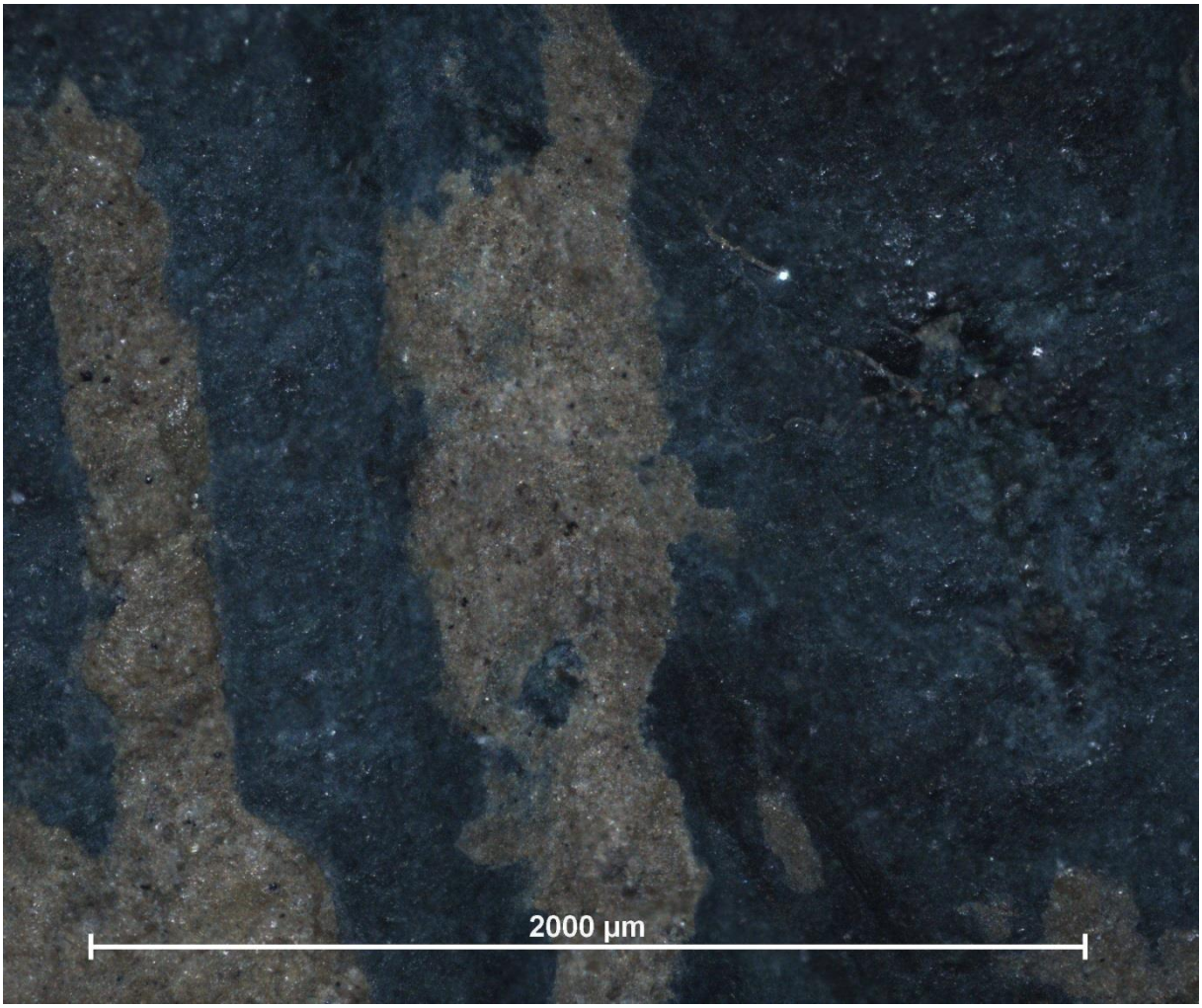

Figure 3. Fitting, find no. 201, before conservation - image from the Nikon Eclipse LV 150 N microscope

7.2. Spur fitting, find no. 202

Item	Spur fitting
Inv . No.	202
Site	Aska East Cemetery 2020
Dimensions [mm]	overall length: 27.8; maximum diameter with nodules: 19.3; minimum diameter (at the edge): 6.2; nodule diameter from 2.5 to 3.3;
Weight [g]	12,489
Raw material	Cu alloy
Procedure	no. 1

Figure 4. Spur fitting, find no. 202, before conservation

Figure 5. Spur fitting, find no. 202, after conservation

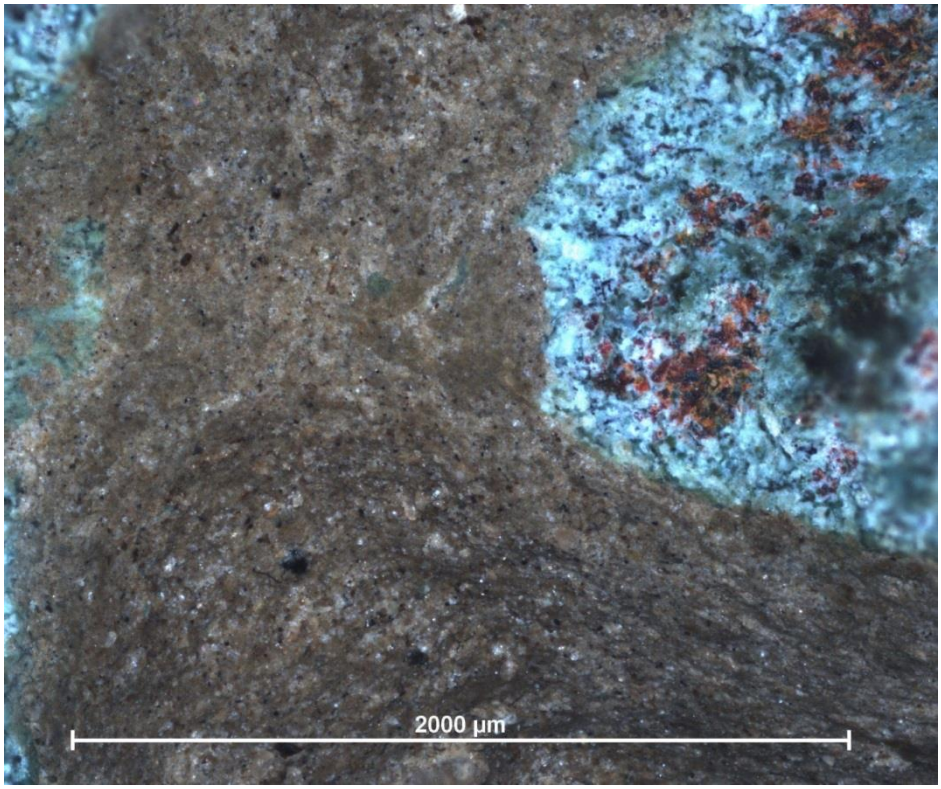

Figure 6. Spur fitting, find no. 202, before conservation - image from the Nikon Eclipse LV 150 N microscope

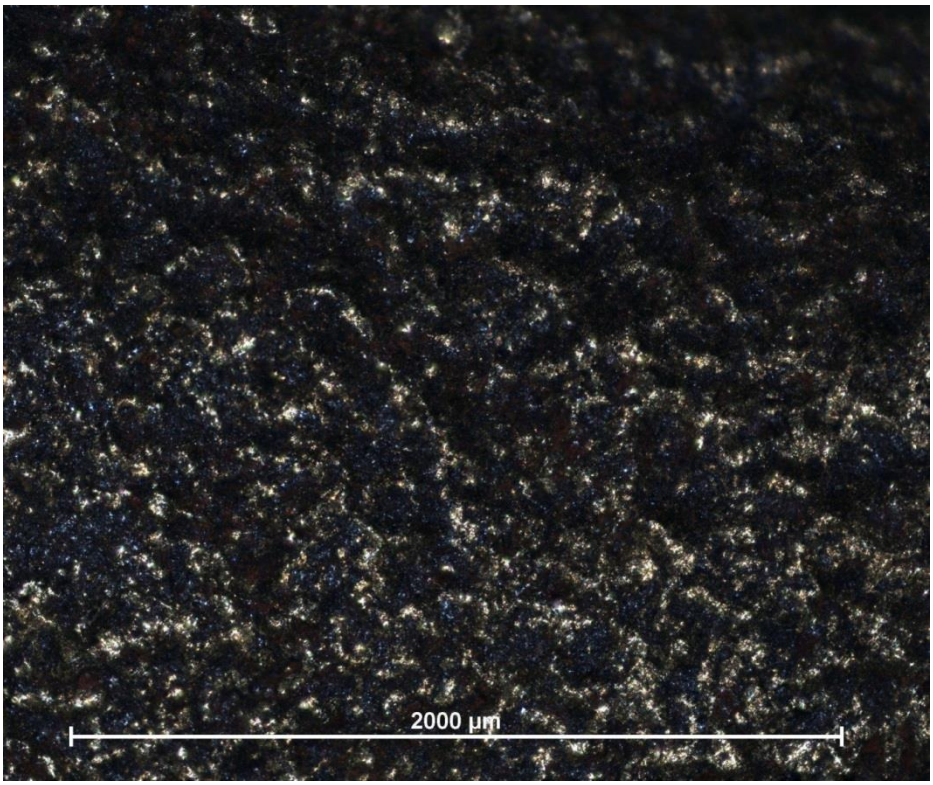

Figure 7. Spur fitting, find no. 202, after conservation - image from the Nikon Eclipse LV 150 N microscope

7.3. Ring, find no. 203

Item	Ring
Inv . No.	203
Site	Aska East Cemetery 2020
Dimensions [cm]	diameter 2.4
Weight [g]	3,675
Raw material	Cu alloy, Au alloy
Procedure	no. 1, 2

Figure 8. Ring, find no. 203, before conservation

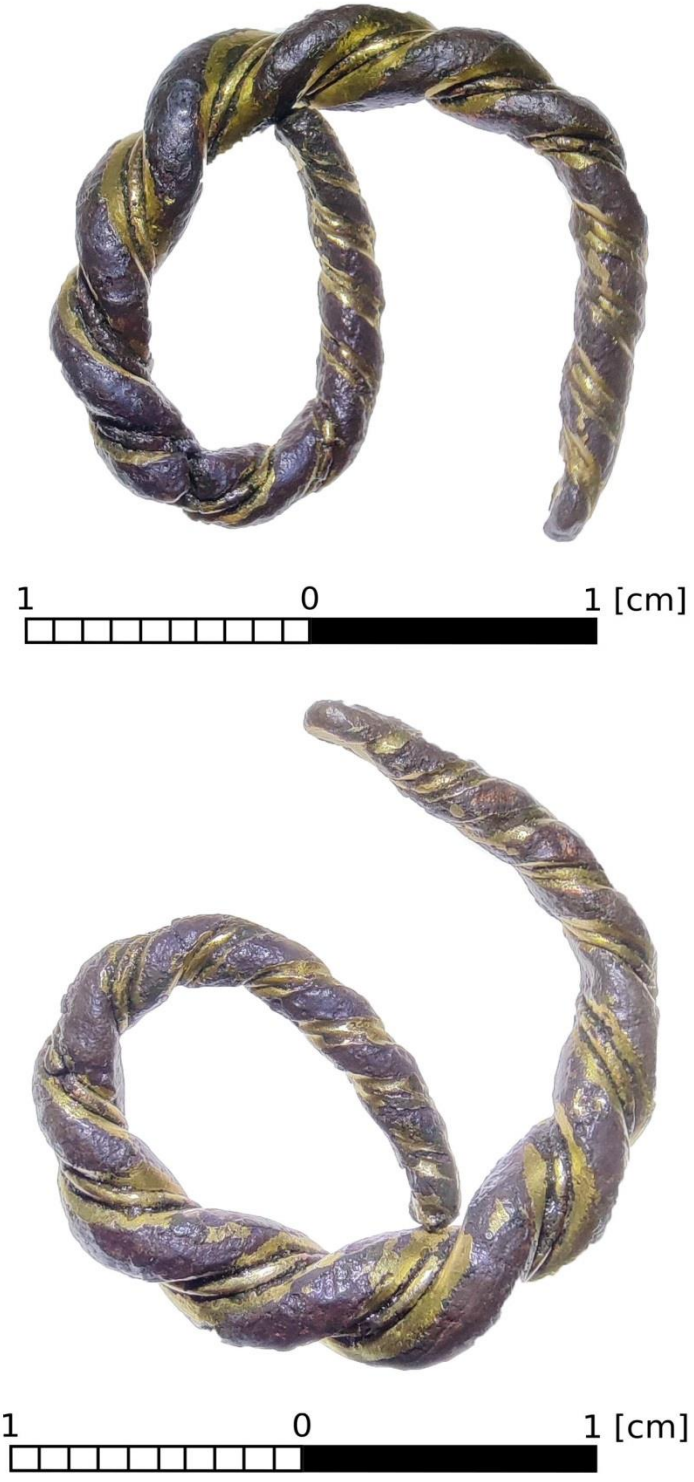

Figure 9. Ring, find no. 203, after conservation

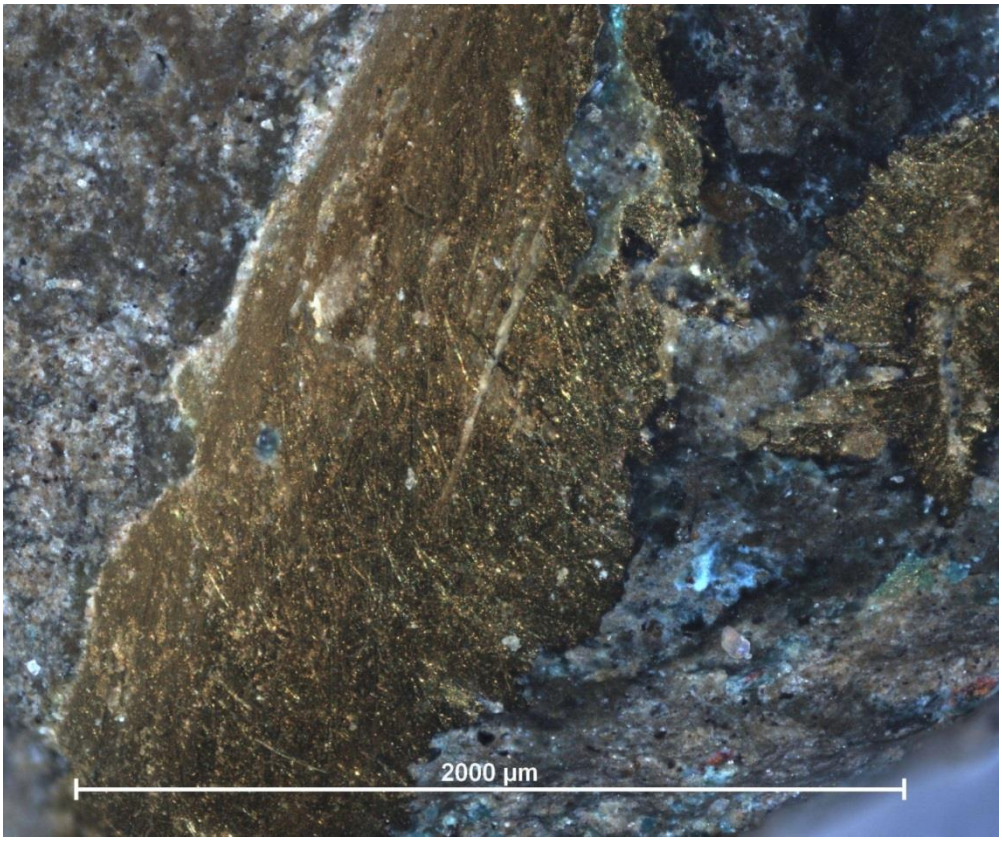

Figure 10. Ring, find no. 203, before conservation - image from the Nikon Eclipse LV 150 N microscope

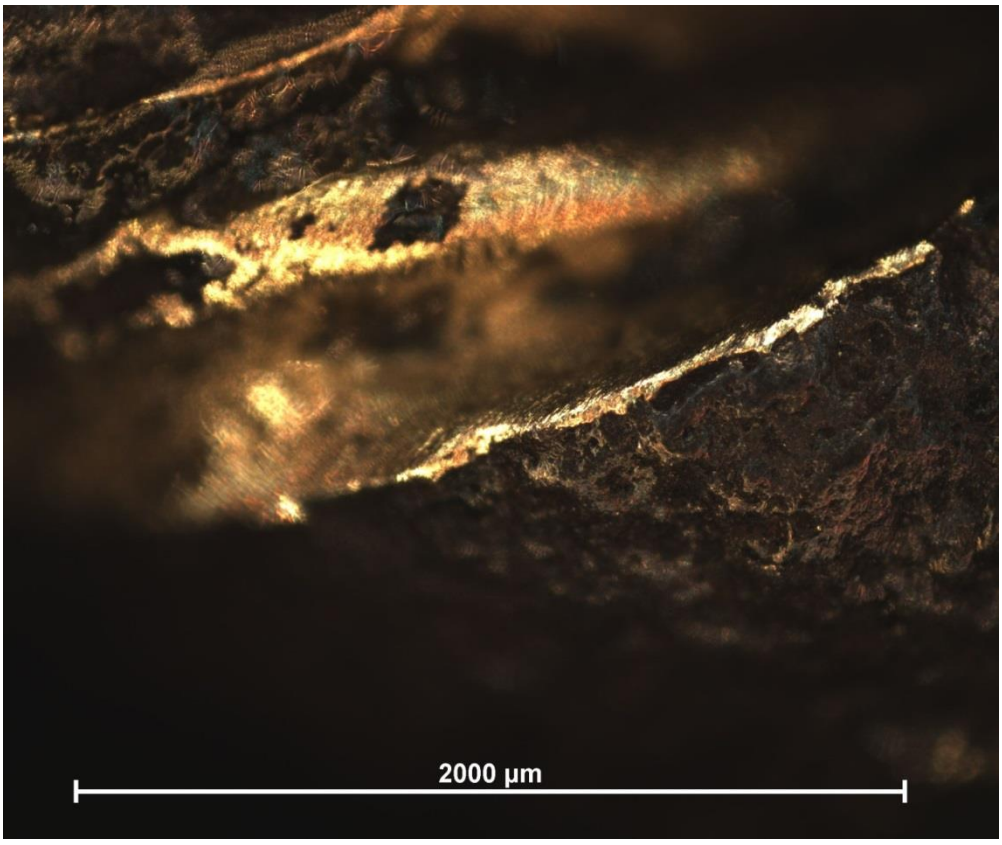

Figure 11. Ring, find no. 203, after conservation - image from the Nikon Eclipse LV 150 N microscope

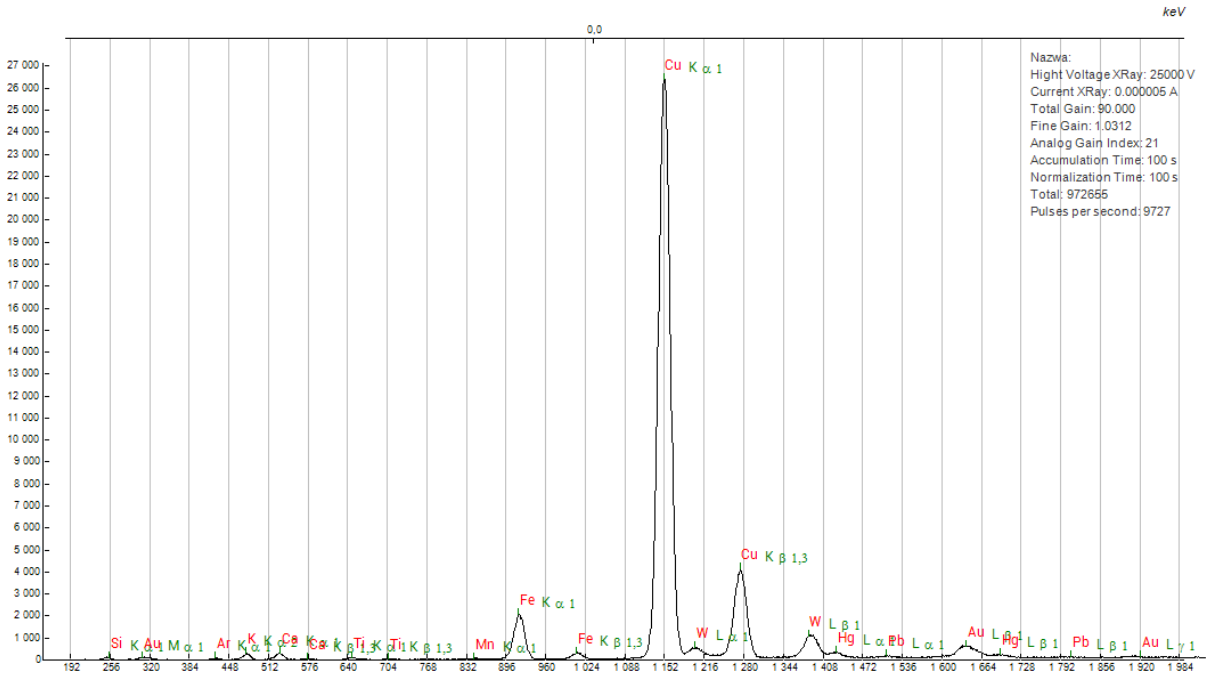

Figure 12. Ring, find no. 203 - spectrogram

7.4. Brooch, find no. 204

Item	Brooch
Inv . No.	204
Site	Aska East Cemetery 2020
Dimensions [mm]	length: 48.2; width: 12.1
Weight [g]	12,625
Raw material	Cu alloy, Fe alloy
Procedure	no. 1, 4

Figure 13. Brooch, find no. 204, before conservation

Figure 14. Brooch, find no. 204, before conservation

Figure 15. Brooch, find no. 204, after conservation

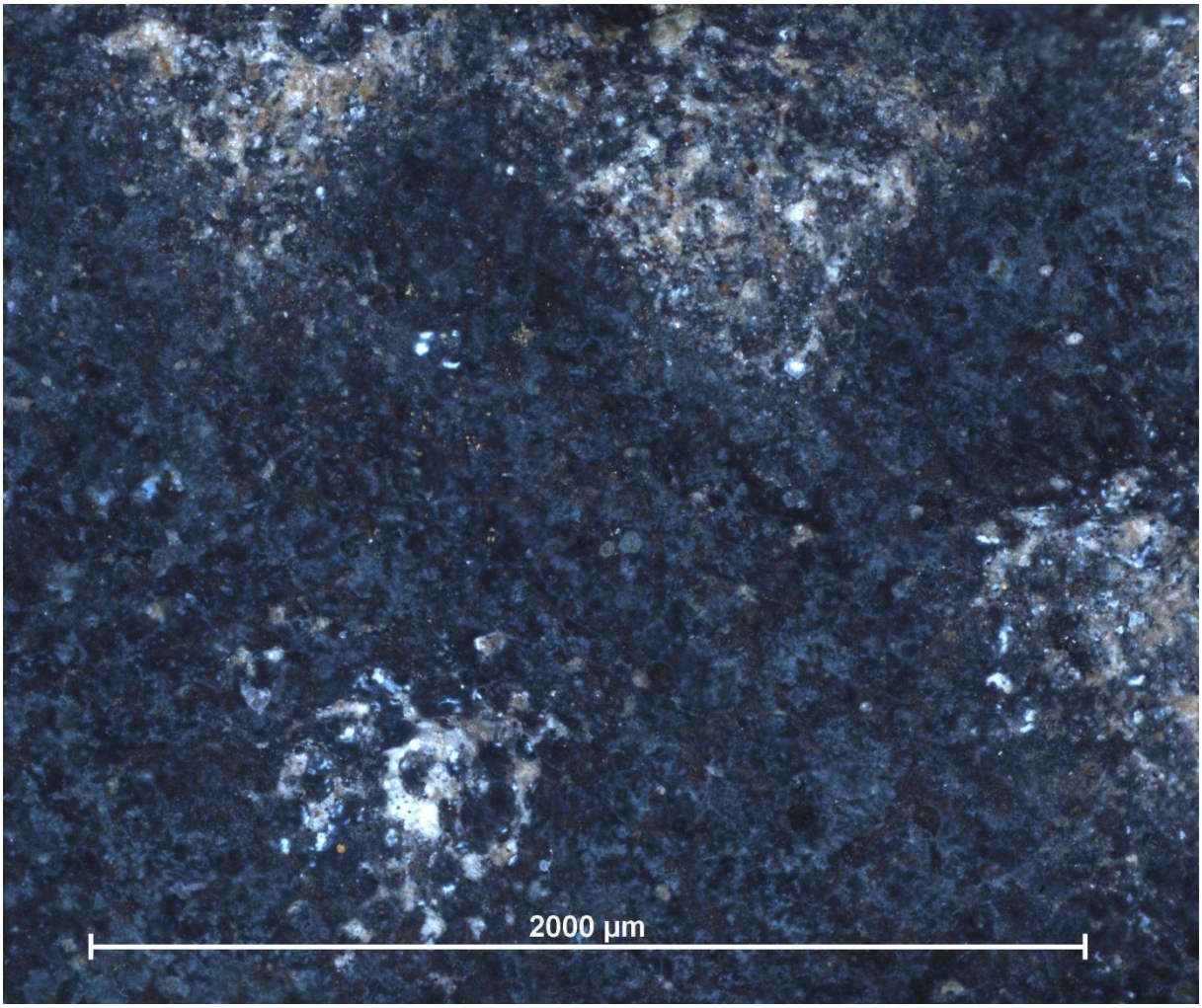

Figure 16. Brooch, find no. 204, before conservation - image from the Nikon Eclipse LV 150 N microscope

7.5. Spindle whorl, find no. 205

Item	Spindle whorl
Inv . No.	205
Site	Aska East Cemetery 2020
Dimensions [mm]	no data
Weight [g]	8,373
Raw material	Pb
Procedure	no. 3

Figure 17. Spindle whorl, find no. 205, before conservation

Figure 18. Spindle whorl, find no. 205, after conservation

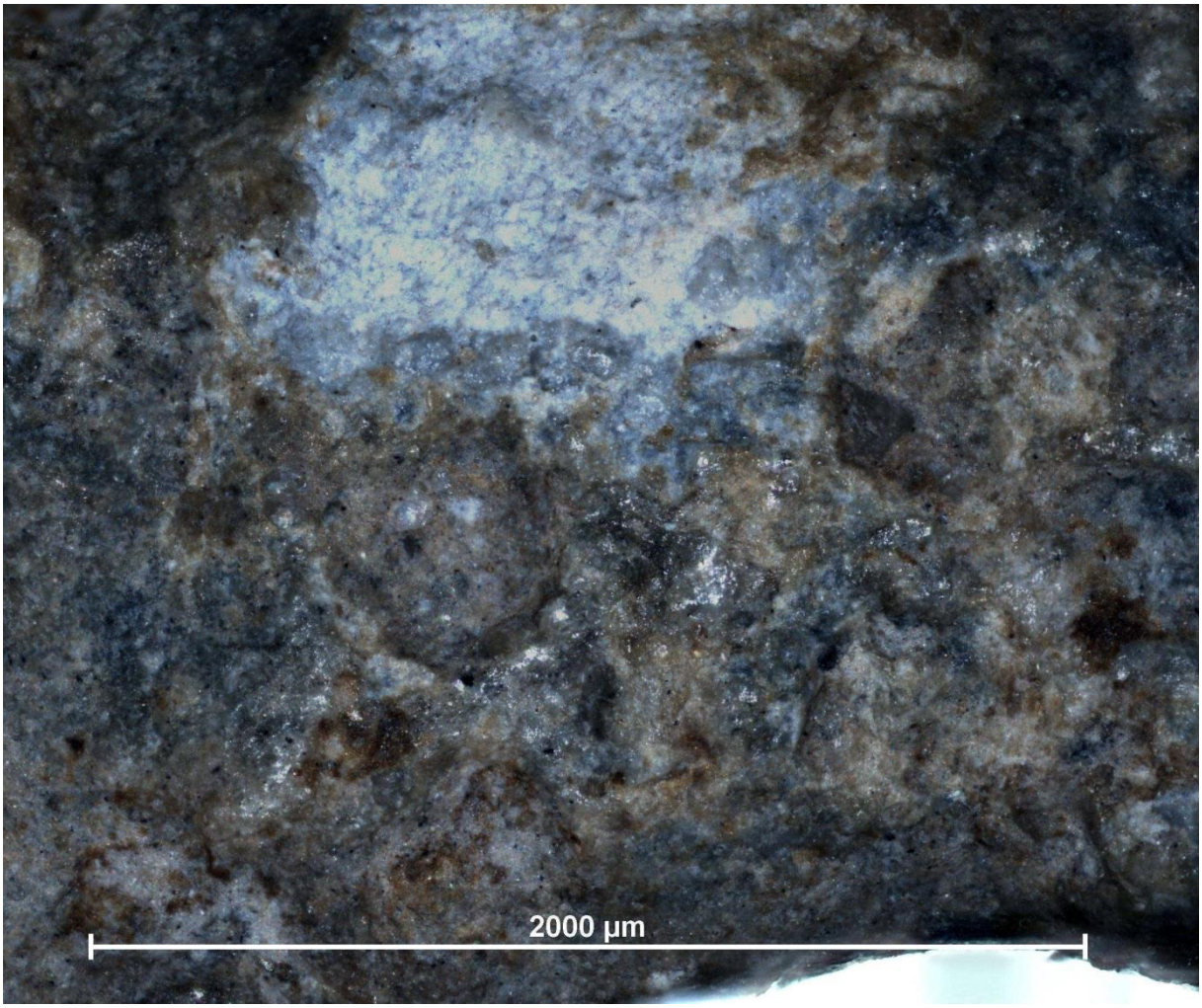

Figure 19. Spindle whorl, find no. 205, before conservation - image from the Nikon Eclipse LV 150 N microscope

7.6. Tortoise brooch, find no. 206

Item	Tortoise brooch
Inv . No.	206
Site	Aska East Cemetery 2020
Dimensions [cm]	4.13 x 3.11 x 1.74 (max. total height) x 0.13
Weight [g]	10,458
Raw material	Cu alloy
Procedure	no. 1

Figure 20. Tortoise brooch, find no. 206, before conservation

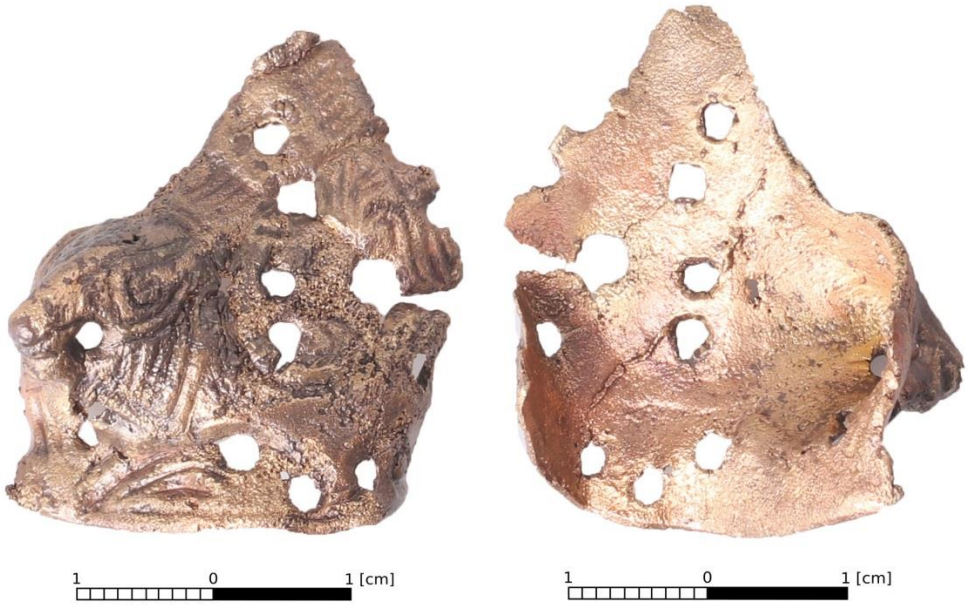

Figure 21. Tortoise brooch, find no. 206, after conservation

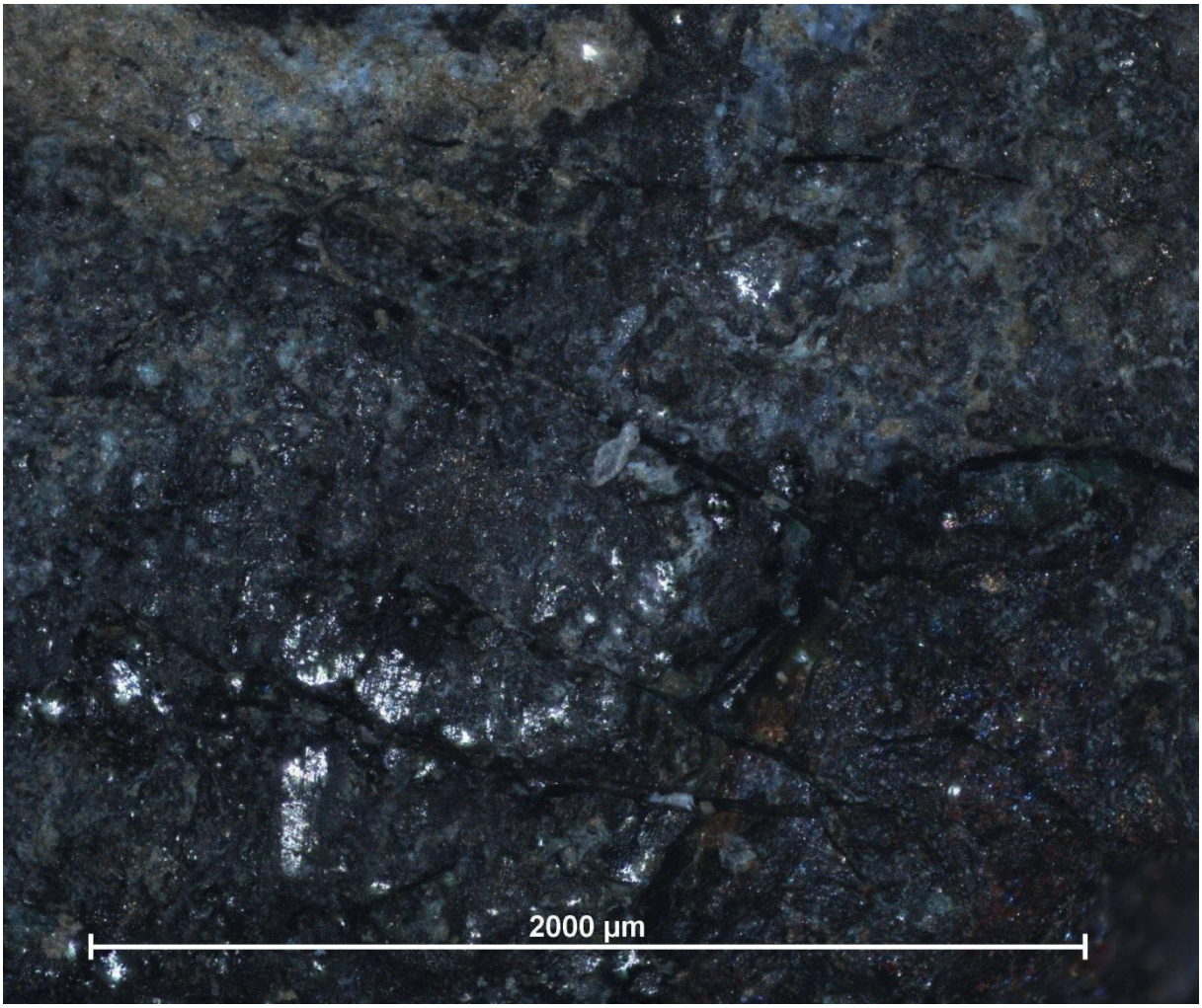

Figure 22. Tortoise brooch, find no. 206, before conservation - image from the Nikon Eclipse LV 150 N microscope

7.7. Tortoise brooch, find no. 207

Item	Tortoise brooch
Inv . No.	207
Site	Aska East Cemetery 2020
Dimensions [cm]	3,28 x 2,96 x 0,12
Weight [g]	5,006
Raw material	Cu alloy
Procedure	no. 1

Figure 23. Tortoise brooch, find no. 207, before conservation

Figure 24. Tortoise brooch, find no. 207, after conservation

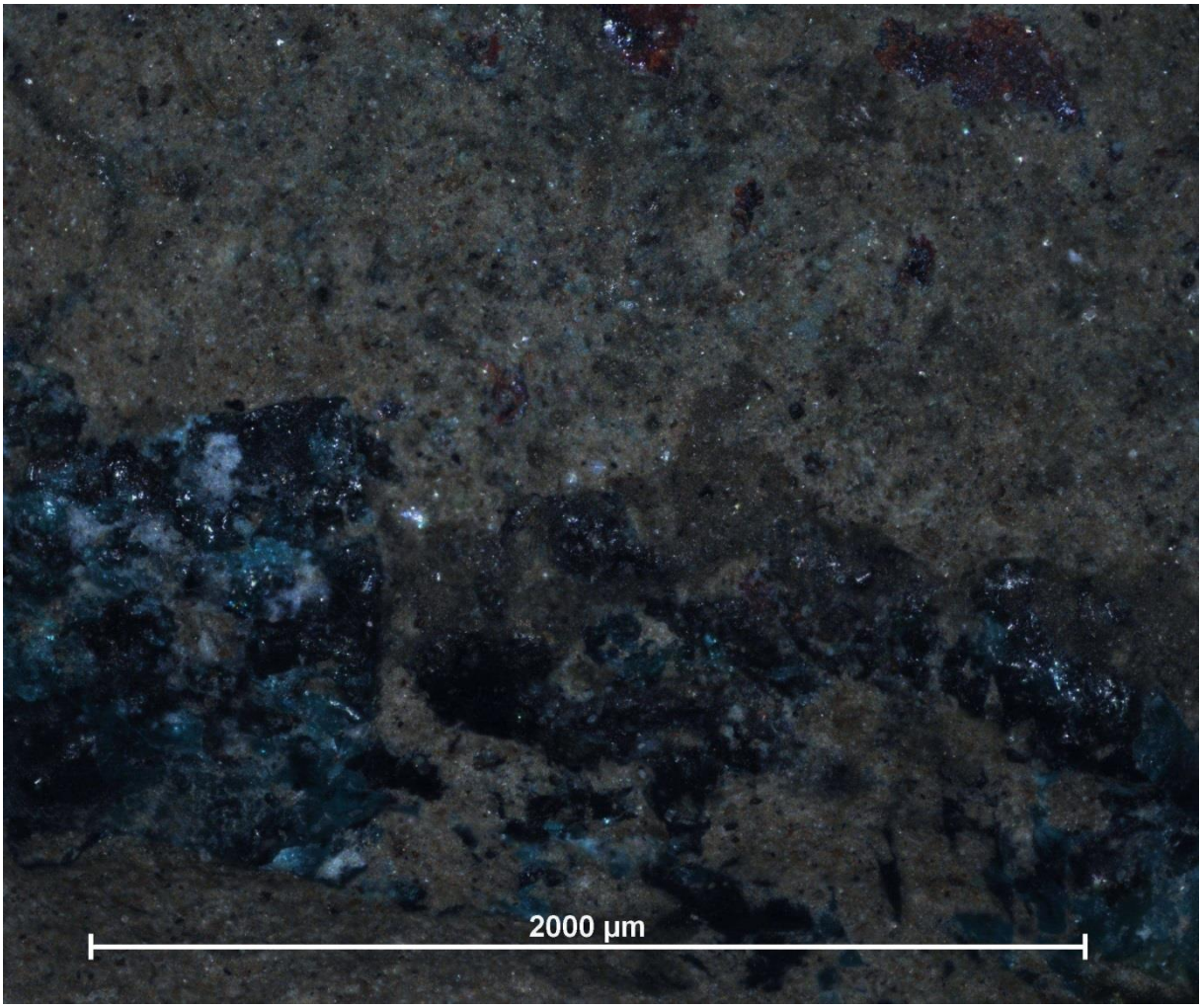

Figure 25. Tortoise brooch, find no. 207, before conservation - image from the Nikon Eclipse LV 150 N microscope

7.8. Coin, find no. 208

Item	Coin (Dirham Samanid)
Inv . No.	208
Site	Aska East Cemetery 2020
Dimensions [mm]	12.6x12.6; thickness 0.8
Weight [g]	0,602
Raw material	Ag alloy
Procedure	no. 2

Figure 26. Coin, find no. 208, before conservation

Figure 27. Coin, find no. 208, after conservation

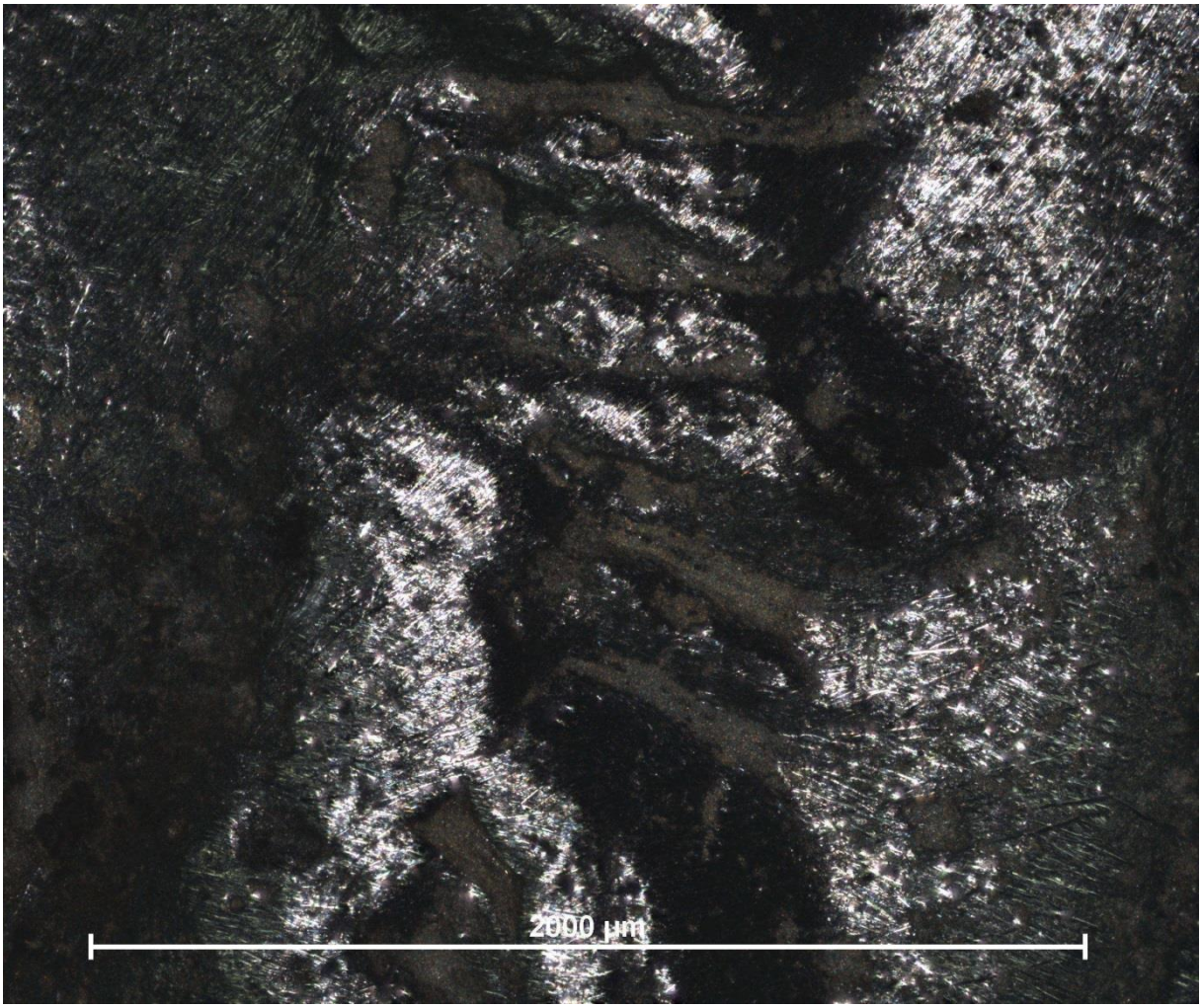

Figure 28. Coin, find no. 208, after conservation - image from the Nikon Eclipse LV 150 N microscope

7.9. Coin, find no. 209

Item	Coin (dirham imitation?)
Inv . No.	209
Site	Aska East Cemetery 2020
Dimensions [mm]	17.2 x 12.6; thickness 0.8
Weight [g]	1,057
Raw material	Ag alloy
Procedure	no. 2

Figure 29. Coin, find no. 209, before conservation

Figure 30. Coin, find no. 209, after conservation

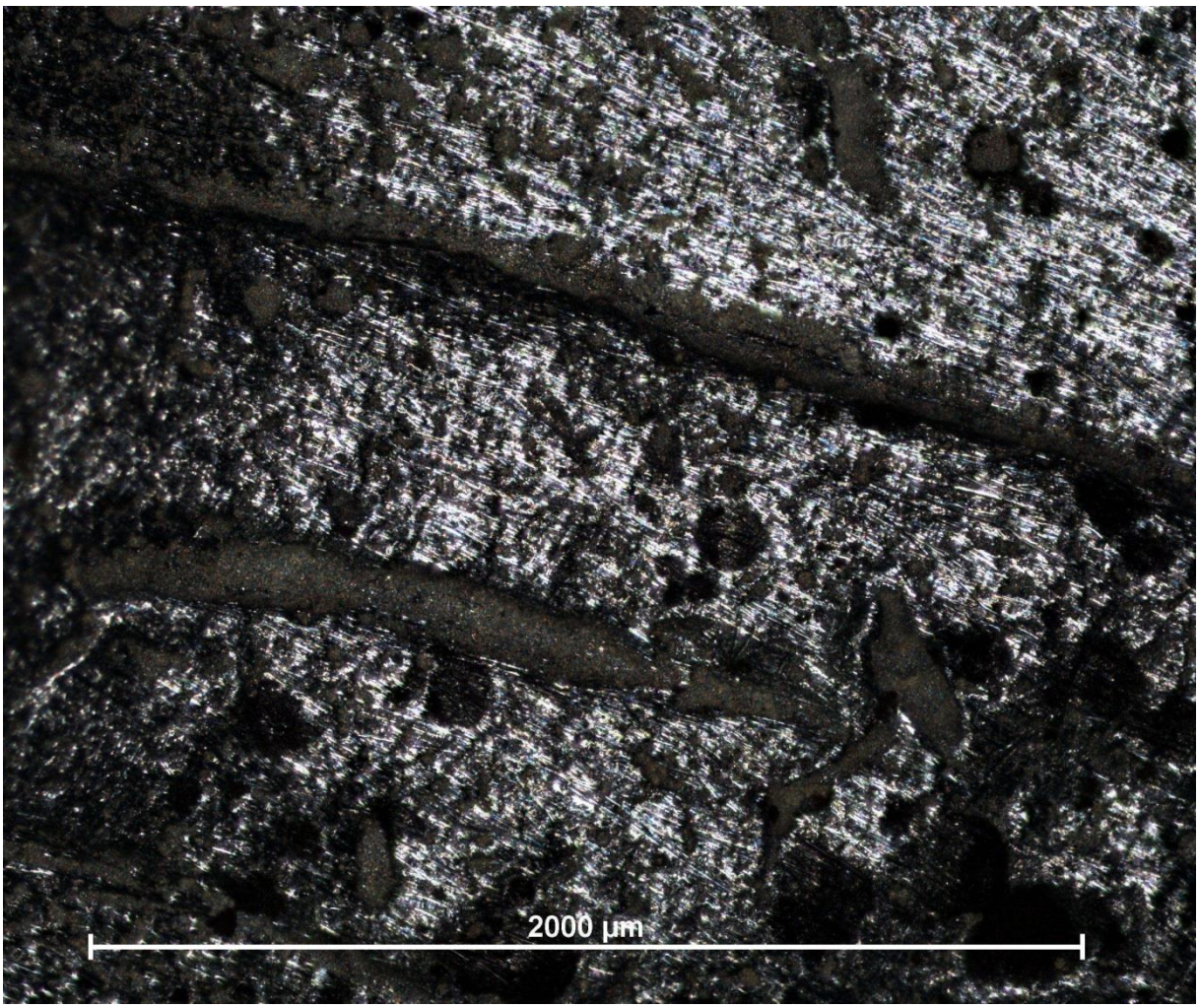

Figure 31. Coin, find no. 209, after conservation

7.10. Coin, find no. 210

Item	Coin (Christian I, hwid)
Inv . No.	210
Site	Aska East Cemetery 2020
Dimensions [mm]	diameter 16.3; thickness 0.5
Weight [g]	0,547
Raw material	Ag alloy
Procedure	no .2

Figure 32. Coin, find no. 210, before conservation

Figure 33. Coin, find no. 210, after conservation

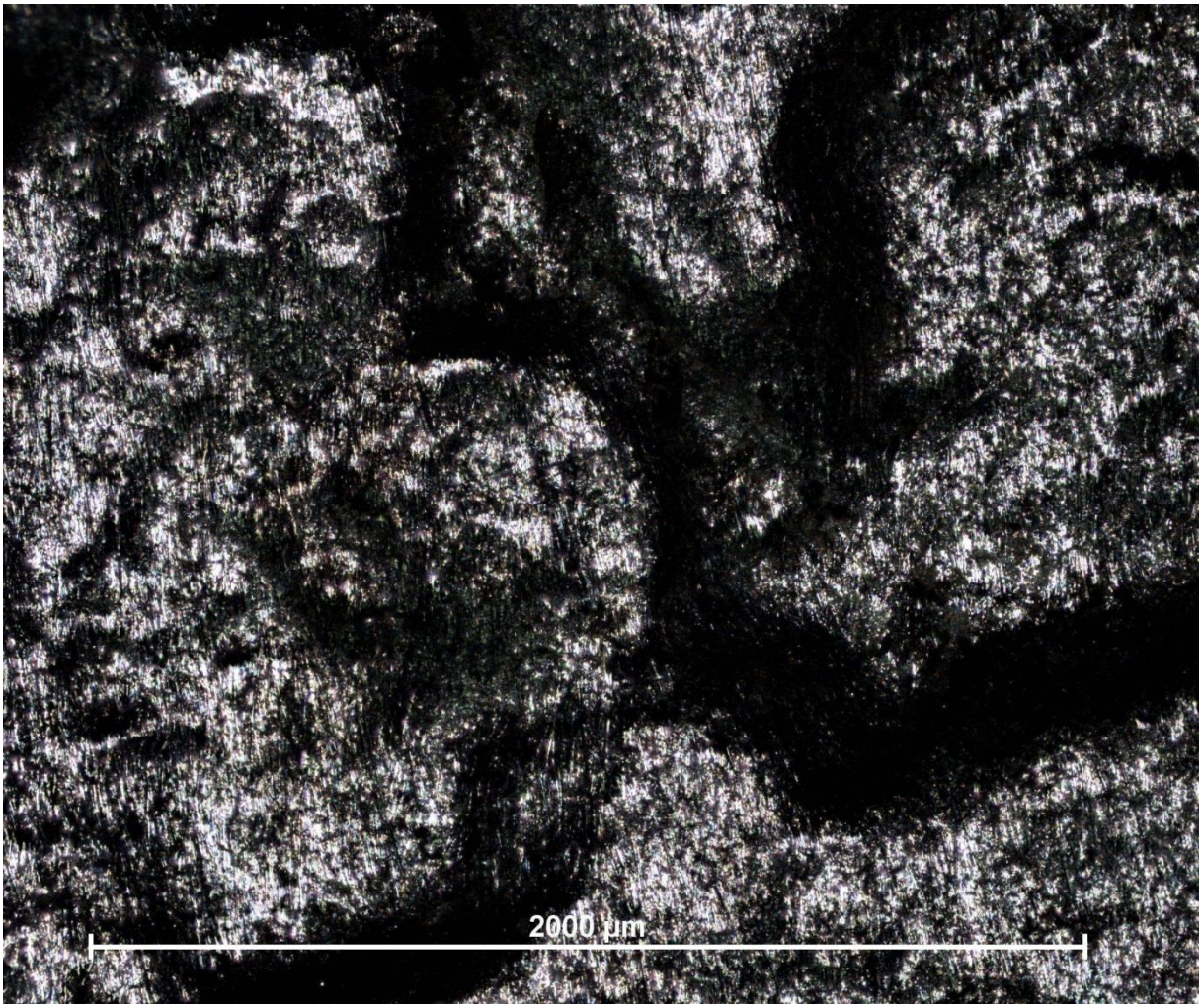

Figure 34. Coin, find no. 210, after conservation - image from the Nikon Eclipse LV 150 N microscope

7.11. Disc, find no. 211

Item	Disc (decorated, gilded)
Inv . No.	211
Site	Aska East Cemetery 2020
Dimensions [cm]	średnica 2,23; grubość blaszki 0,06
Weight [g]	0,99
Raw material	Cu alloy, Au alloy
Procedure	no. 1, 2

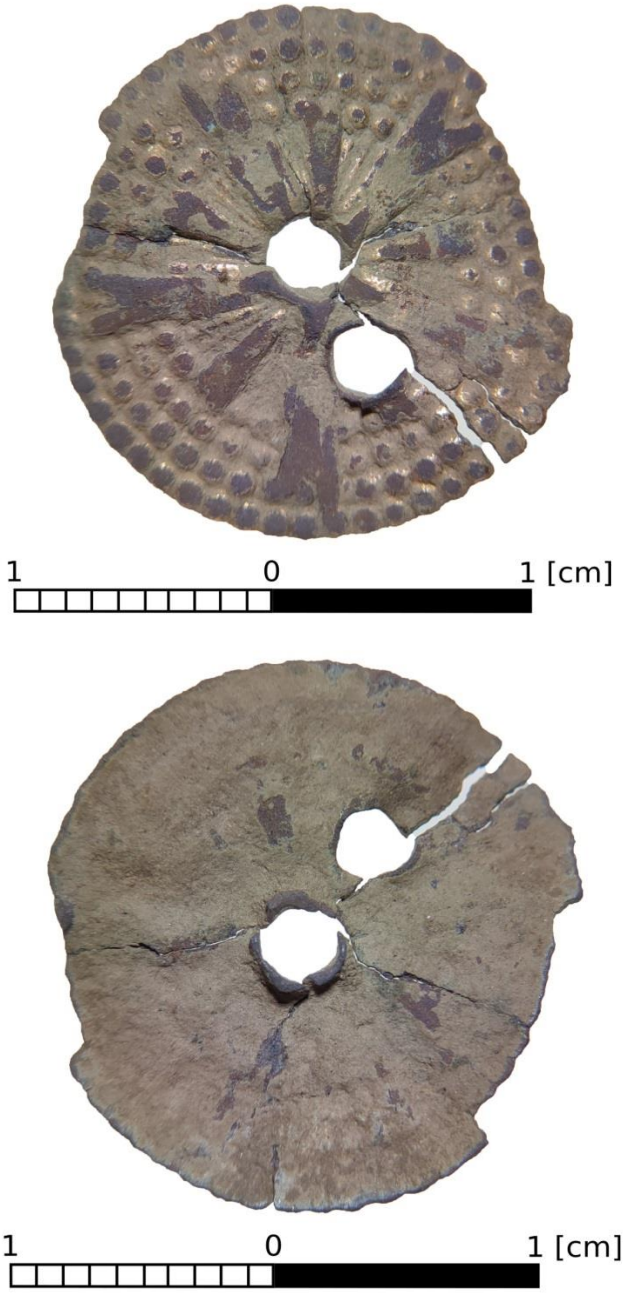

Figure 35. Disc, find no. 211, before conservation

Figure 36. Disc, find no. 211, after conservation

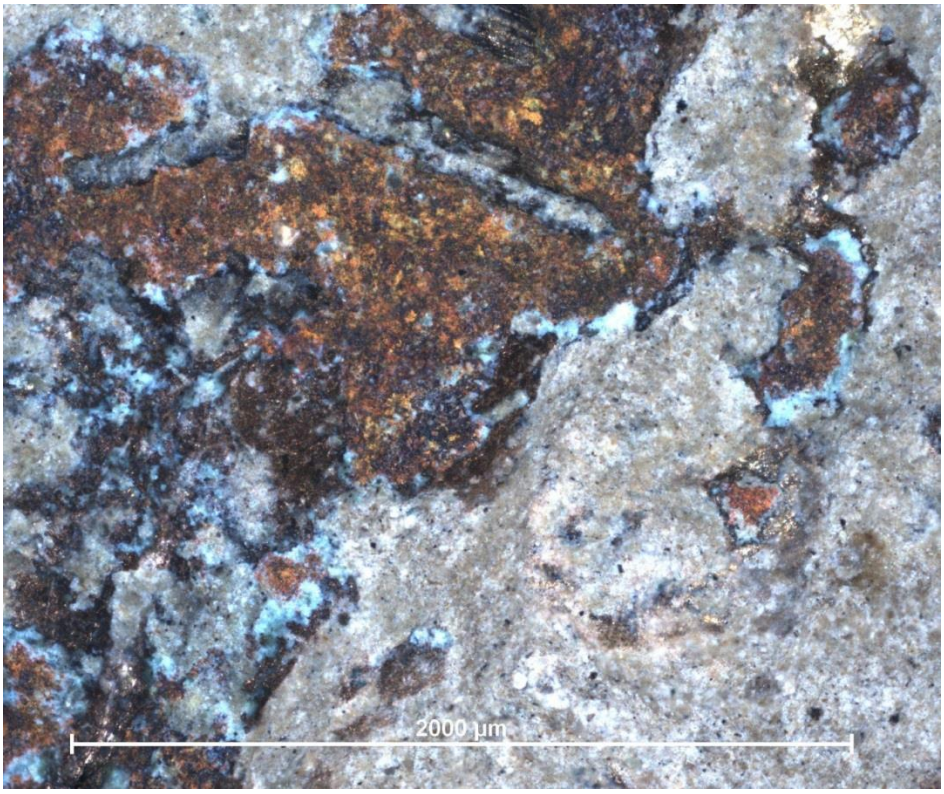

Figure 37. Disc, find no. 211, before conservation - image from the Nikon Eclipse LV 150 N microscope

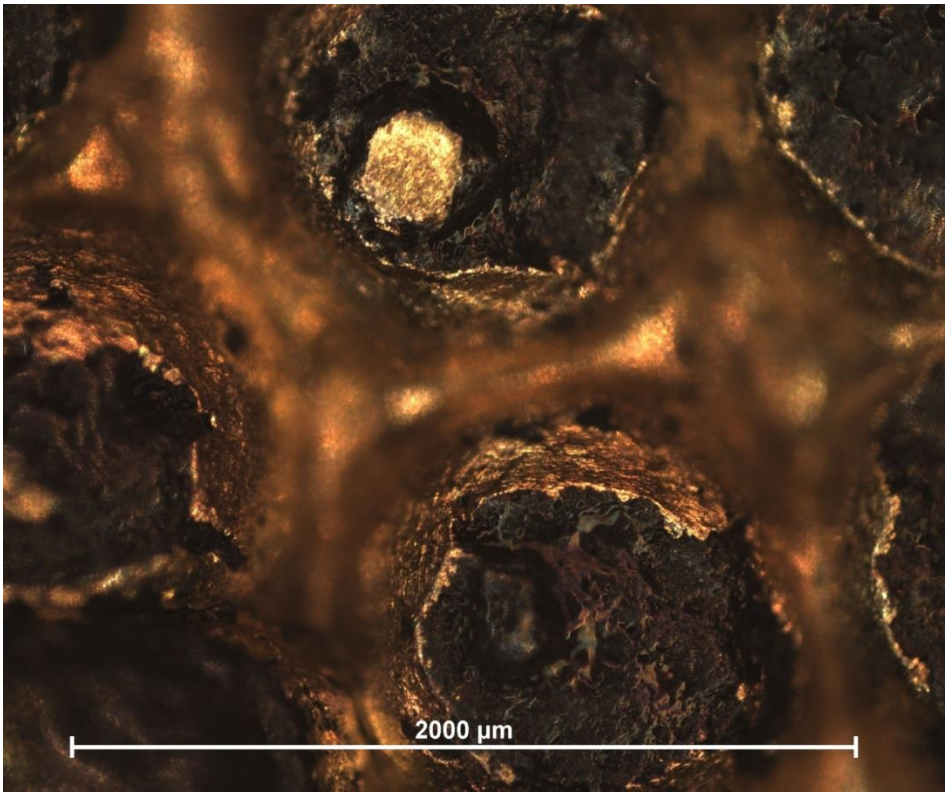

Figure 38. Disc, find no. 211, after conservation - image from the Nikon Eclipse LV 150 N microscope

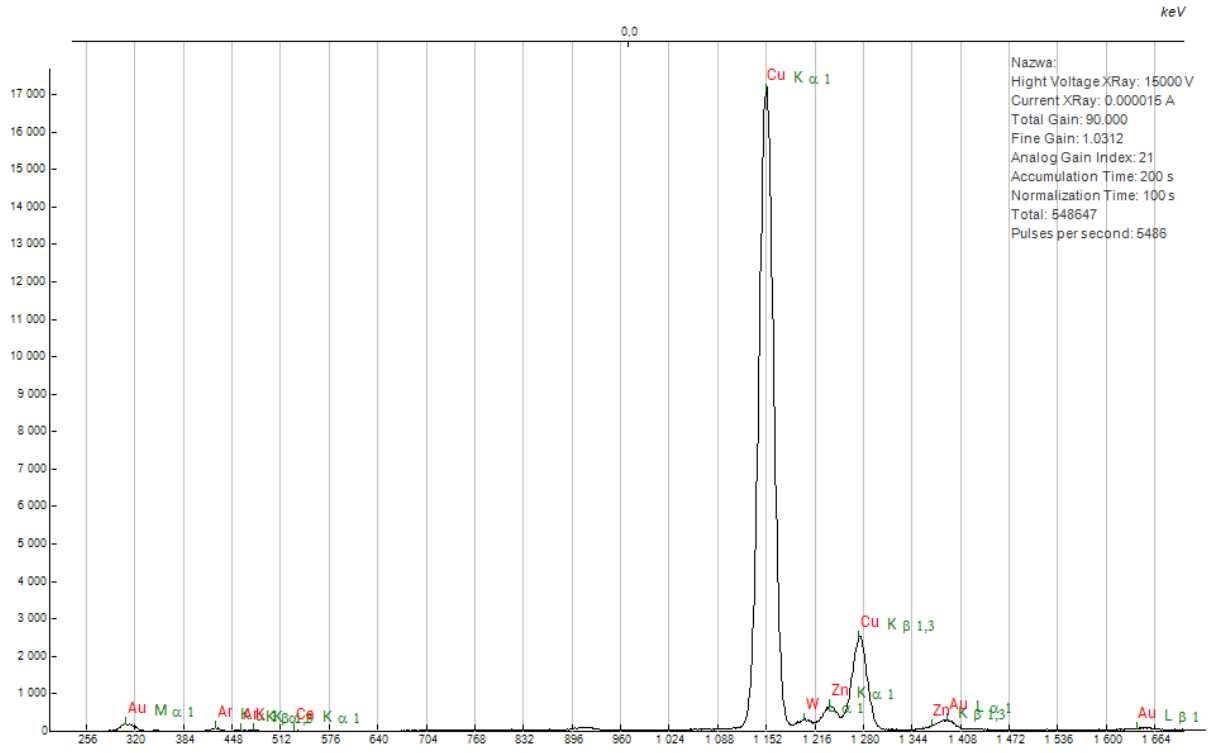

Figure 39. Disc, find no. 211 - spectrogram

7.12. Coin, find no. 212

Item	Coin
Inv . No.	212
Site	Aska East Cemetery 2020
Dimensions [mm]	diameter 15.4; thickness 0.6
Weight [g]	0,591
Raw material	Ag alloy
Procedure	no. 2

Figure 40. Coin, find no. 212, before conservation

Figure 41. Coin, find no. 212, after conservation

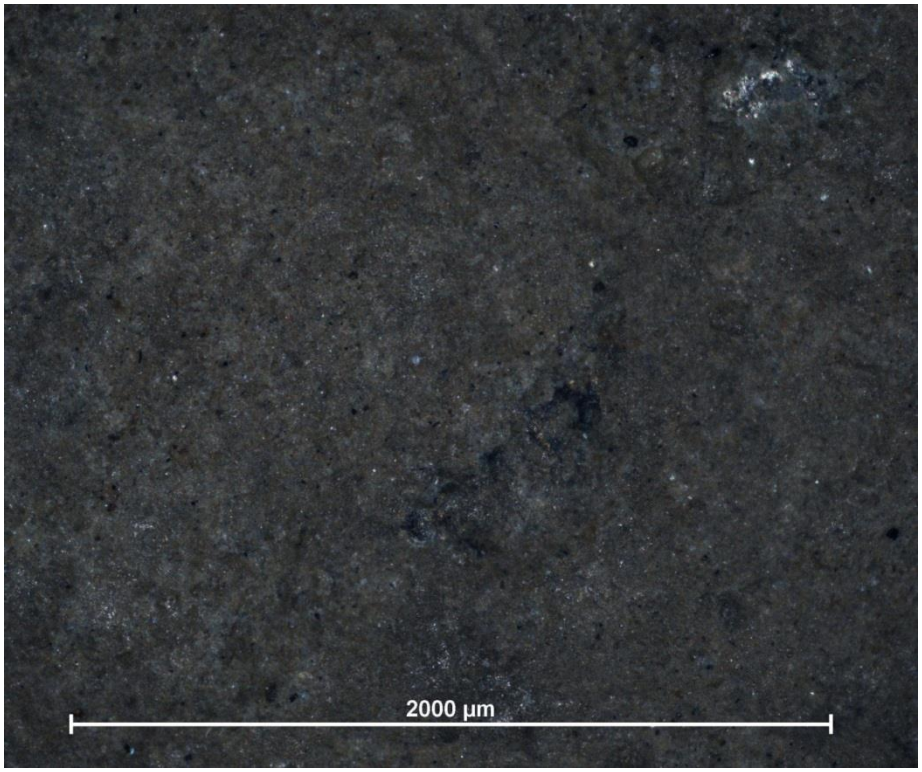

Figure 42. Coin, find no. 212, before conservation - image from the Nikon Eclipse LV 150 N microscope

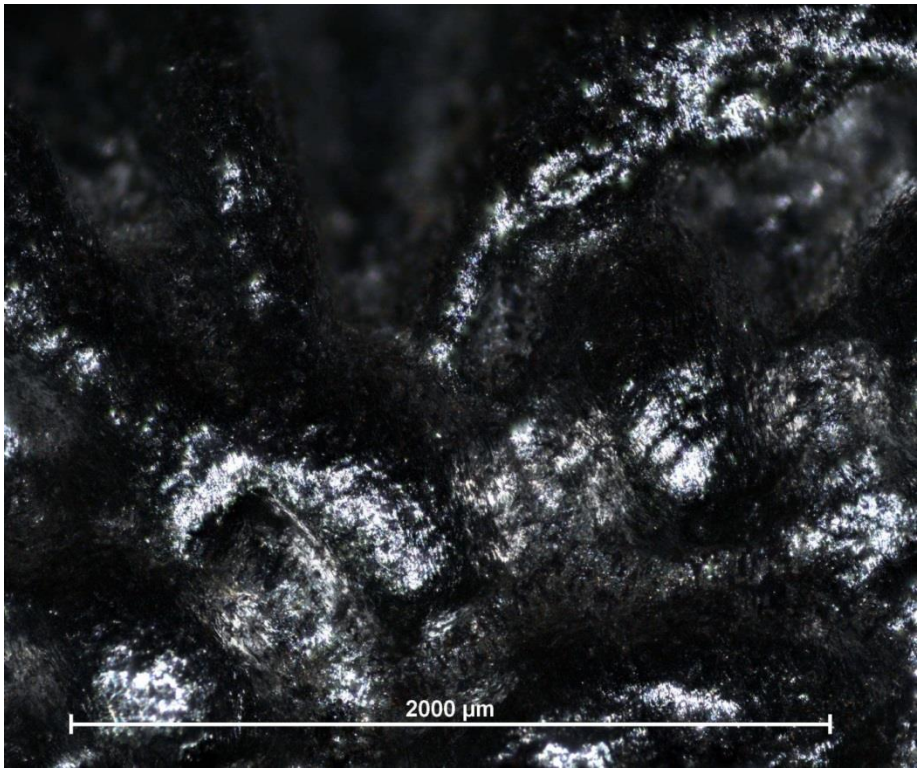

Figure 43. Coin, find no. 212, after conservation - image from the Nikon Eclipse LV 150 N microscope

7.13. Coin, find no. 213

Item	Coin
Inv . No.	213
Site	Aska East Cemetery 2020
Dimensions [mm]	diameter 17.4; thickness 0.7
Weight [g]	0,755
Raw material	Ag alloy
Procedure	no. 2

Figure 44. Coin, find no. 213, before conservation

Figure 45. Coin, find no. 213, after conservation

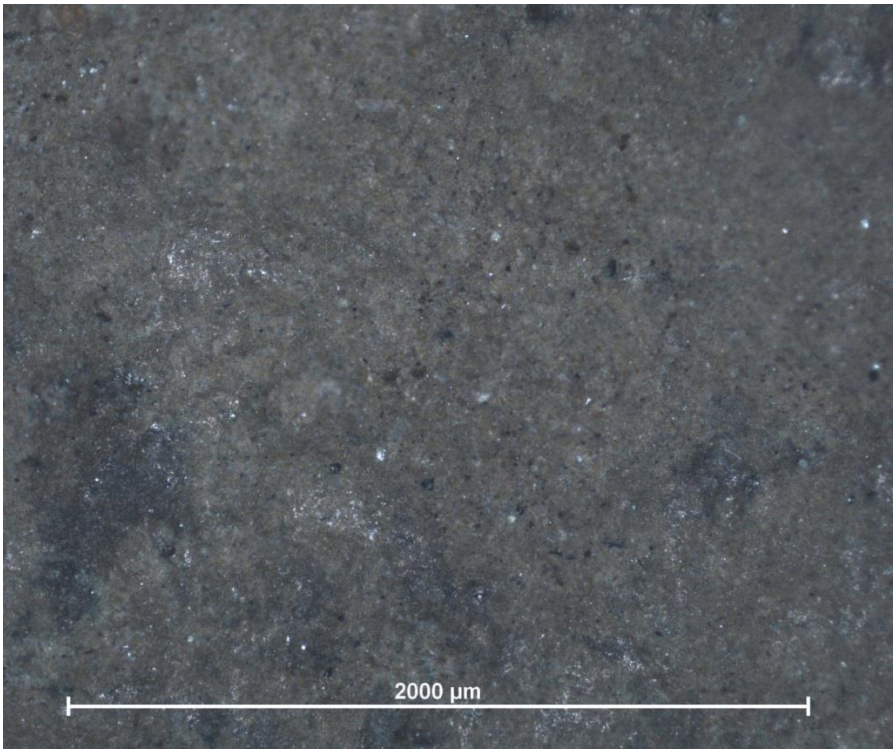

Figure 46. Coin, find no. 213, before conservation - image from the Nikon Eclipse LV 150 N microscope

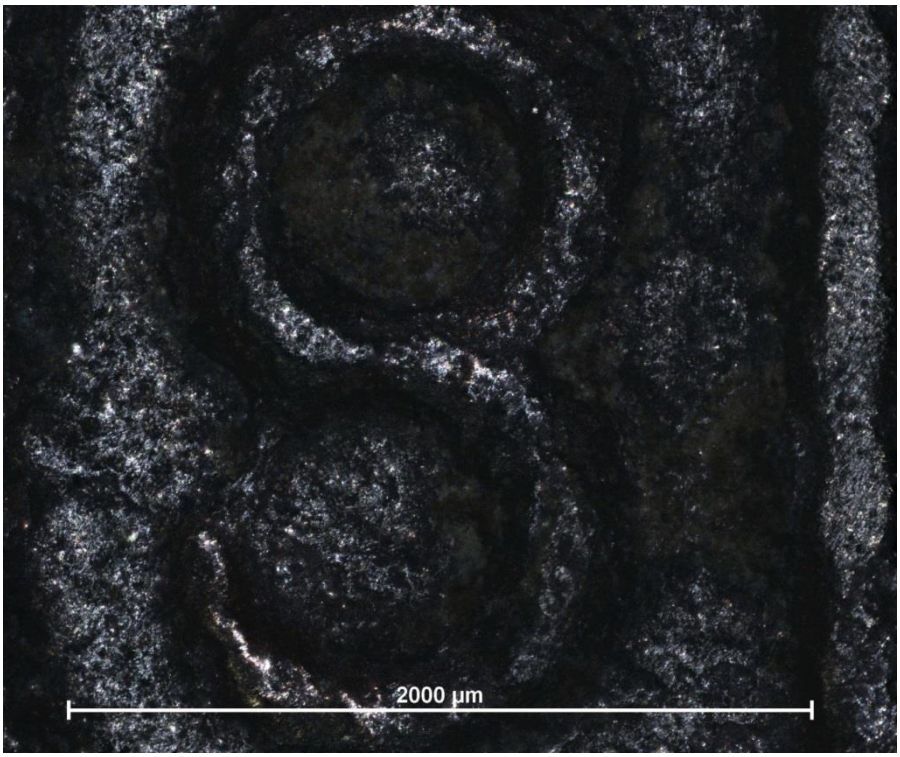

Figure 47. Coin, find no. 213, after conservation - image from the Nikon Eclipse LV 150 N microscope

7.14. Tortoise brooch?, find no. 214

Item	Tortoise brooch?
Inv . No.	214
Site	Aska East Cemetery 2020
Dimensions [mm]	16.6 x 11.5; thickness 1.2
Weight [g]	0,801
Raw material	Cu alloy
Procedure	no. 1

Figure 48. Tortoise brooch?, find no. 214, before conservation

Figure 49. Tortoise brooch?, find no. 214, after conservation

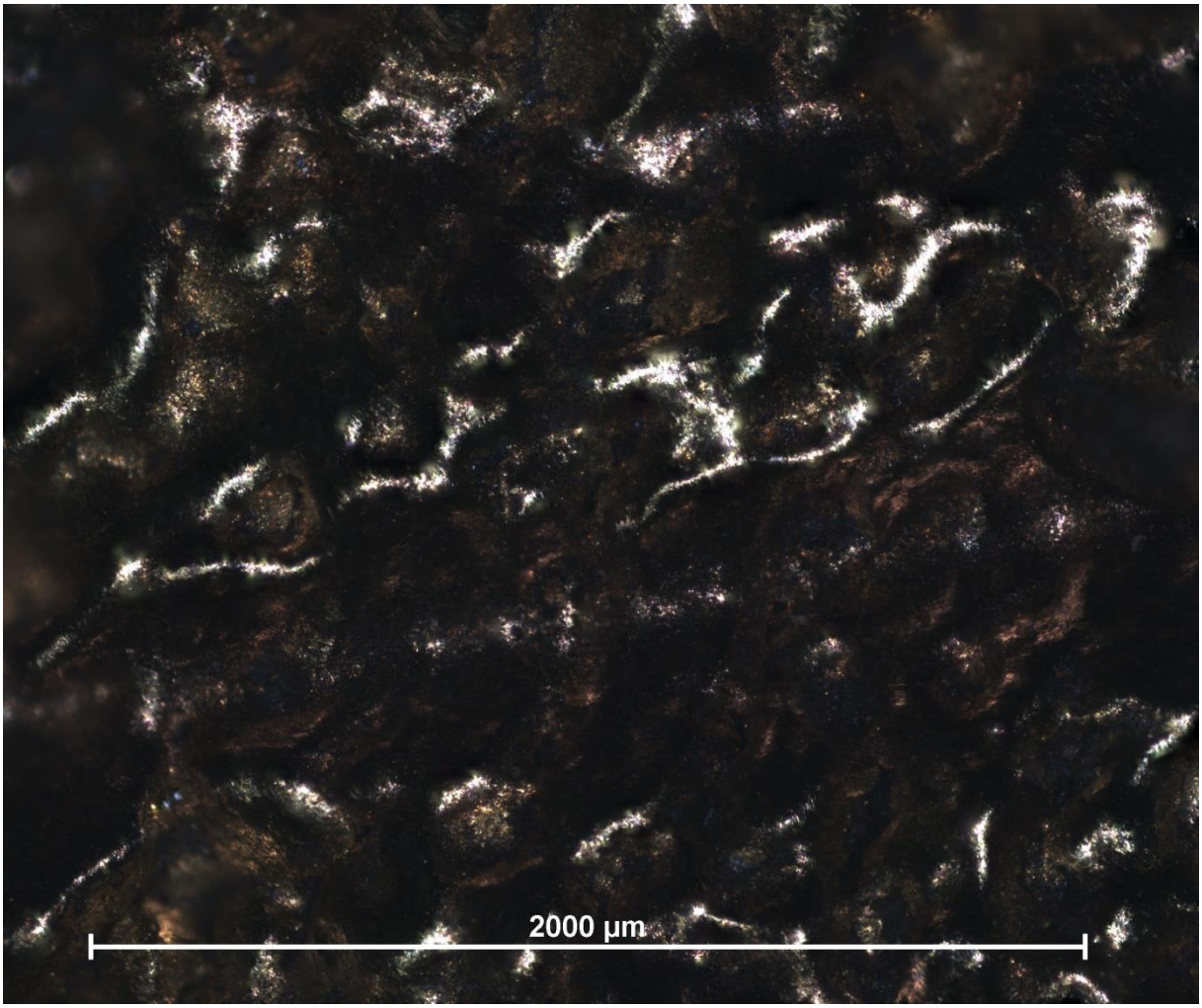

Figure 50. Tortoise brooch?, find no. 214, after conservation - image from the Nikon Eclipse LV 150 N microscope

7.15. Tortoise brooch?, find no. 215

Item	Tortoise brooch?
Inv . No.	215
Site	Aska East Cemetery 2020
Dimensions [mm]	21.9 x 9.2; thickness 1.9
Weight [g]	1,504
Raw material	Cu alloy
Procedure	no. 1

Figure 51. Tortoise brooch?, find no. 215, beforeconservation

Figure 52. Tortoise brooch?, find no. 215, after conservation

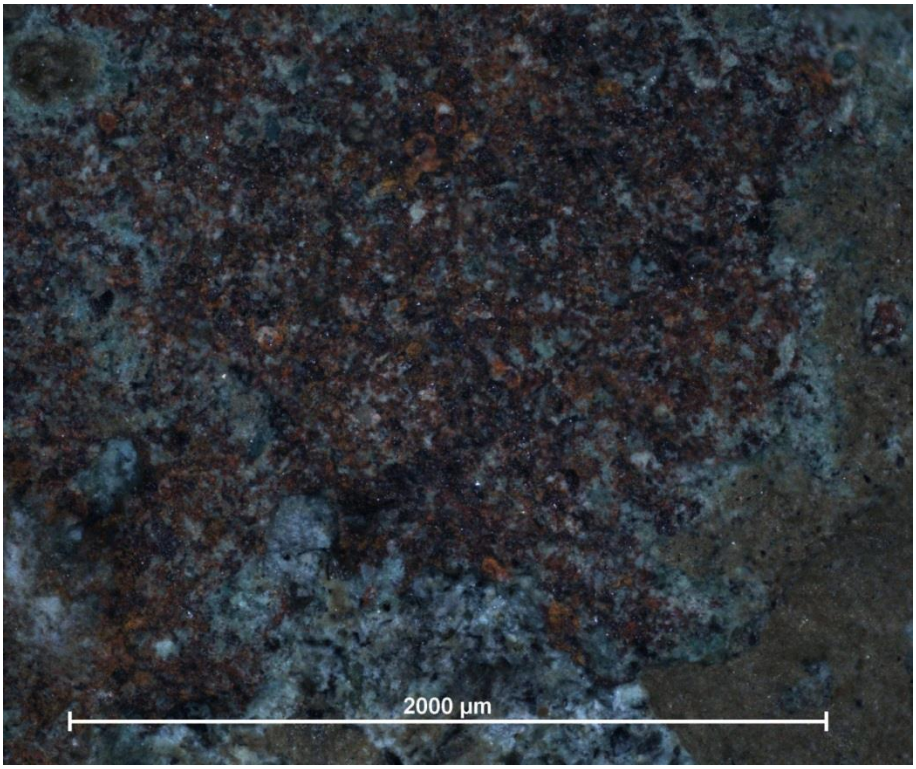

Figure 53. Tortoise brooch?, find no. 215, before conservation - image from the Nikon Eclipse LV 150 N microscope

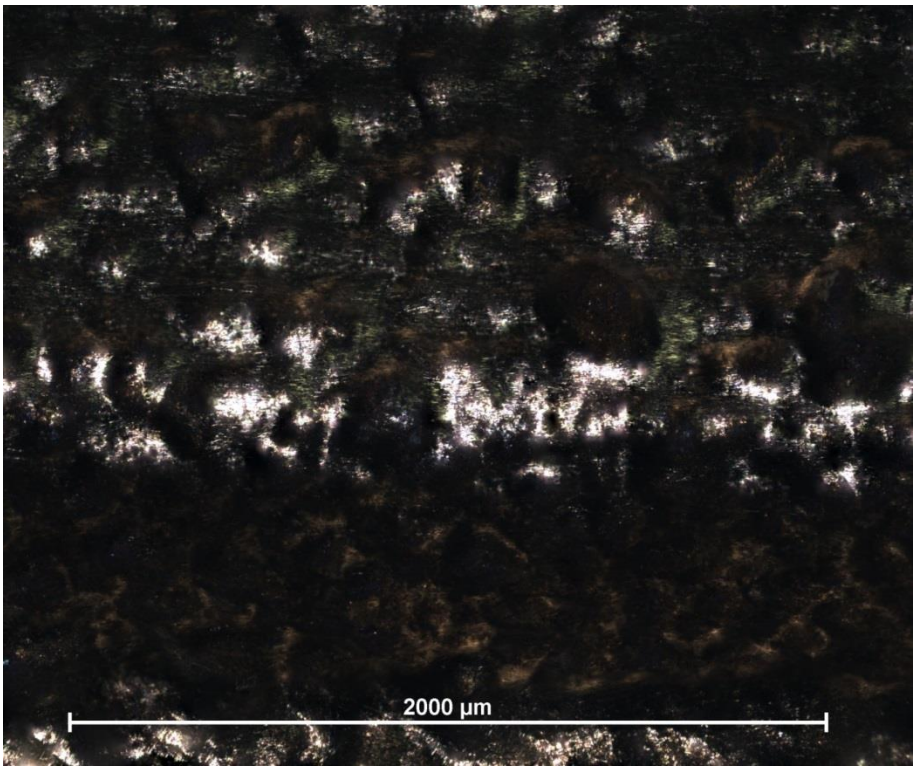

Figure 54. Tortoise brooch?, find no. 215, after conservation - image from the Nikon Eclipse LV 150 N microscope

7.16. Tortoise brooch?, find no. 216

Item	Tortoise brooch?
Inv . No.	216
Site	Aska East Cemetery 2020
Dimensions [mm]	length: 20.2, width: 13.3, thickness: 1.1
Weight [g]	0,871
Raw material	Cu alloy
Procedure	no. 1

Figure 55. Tortoise brooch?, find no. 216, before conservation

Figure 56. Tortoise brooch?, find no. 216, afterr conservation

7.17. Tortoise brooch?, find no. 217

Item	Tortoise brooch?
Inv . No.	217
Site	Aska East Cemetery 2020
Dimensions [mm]	17.8x10.1; thickness 2.0
Weight [g]	1,031
Raw material	Cu alloy
Procedure	no. 1

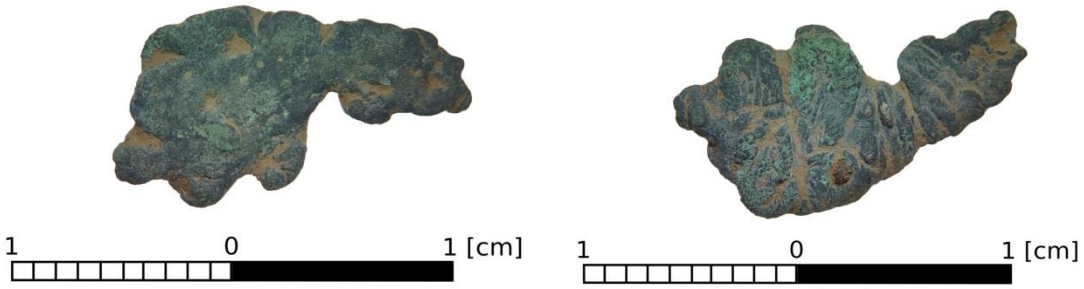

Figure 57. Tortoise brooch?, find no. 217, before conservation

Figure 58. Tortoise brooch?, find no. 217, after conservation

7.18. Disc, find no. 218

Item	Disc
Inv . No.	218
Site	Aska East Cemetery 2020
Dimensions [mm]	maximum length 41.2; maximum width 31.4
Weight [g]	5,70
Raw material	Cu alloy
Procedure	no. 1

Figure 59. Disc, find no. 218, before conservation

Figure 60. Disc, find no. 218, after conservation

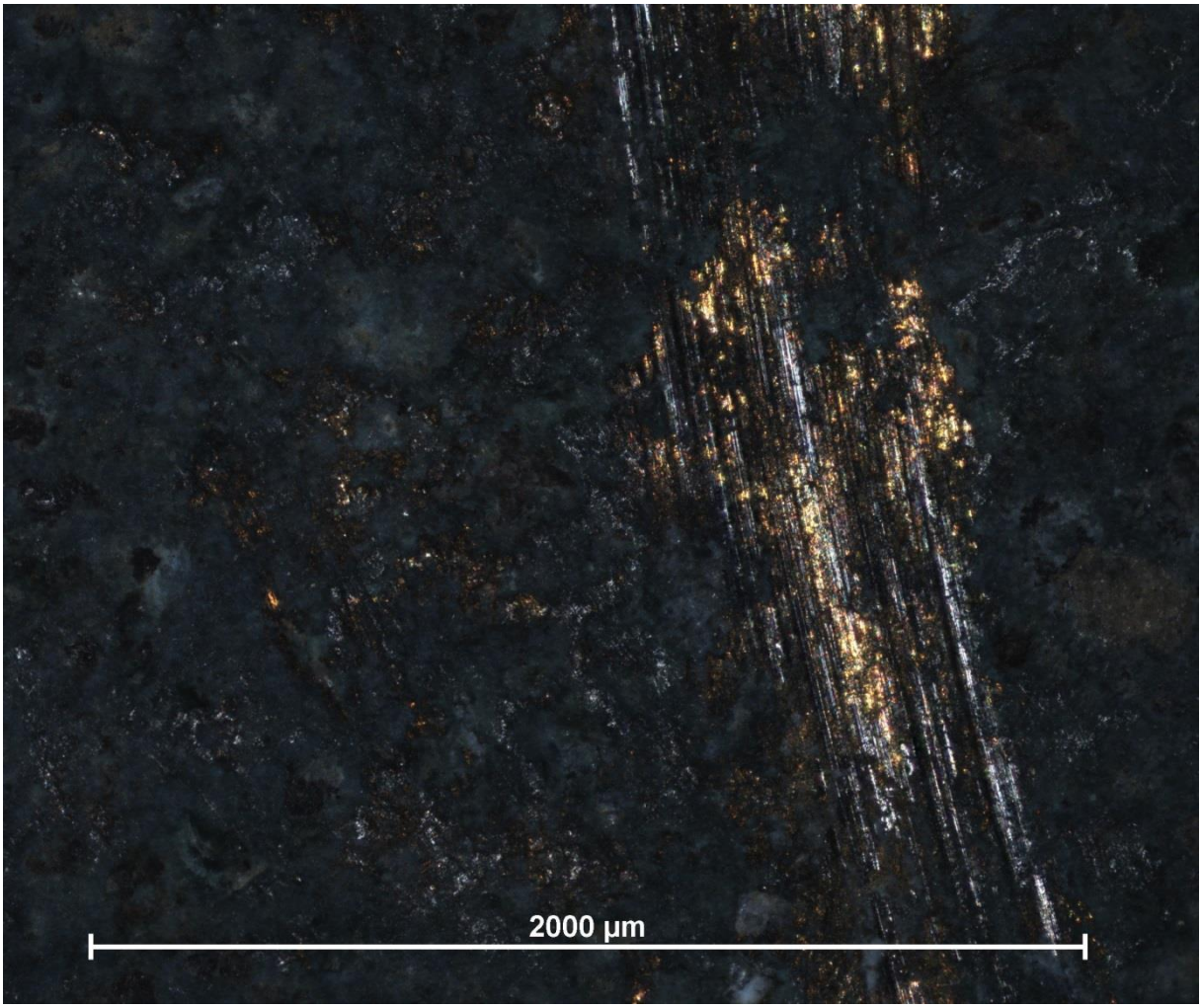

Figure 61. Disc, find no. 218, before conservation

7.19. Chip, find no. 219

Item	Chip
Inv . No.	219
Site	Aska East Cemetery 2020
Dimensions [mm]	18,4 x 19,2 x 3,2
Weight [g]	1,40
Raw material	flint
Procedure	not applicable

Figure 62. Chip, find no. 219, before purification

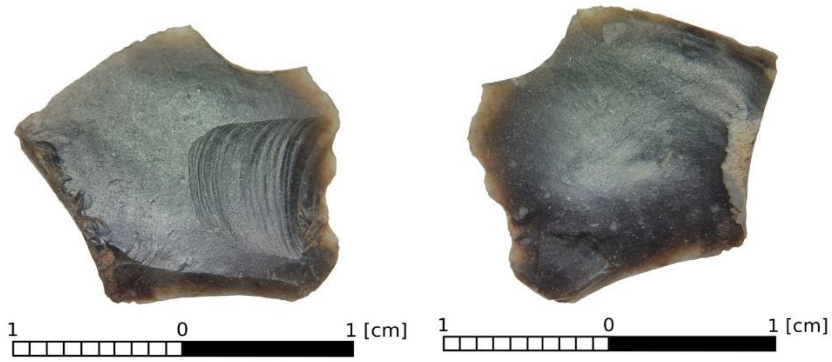

Figure 63. Chip, find no. 219, after purification

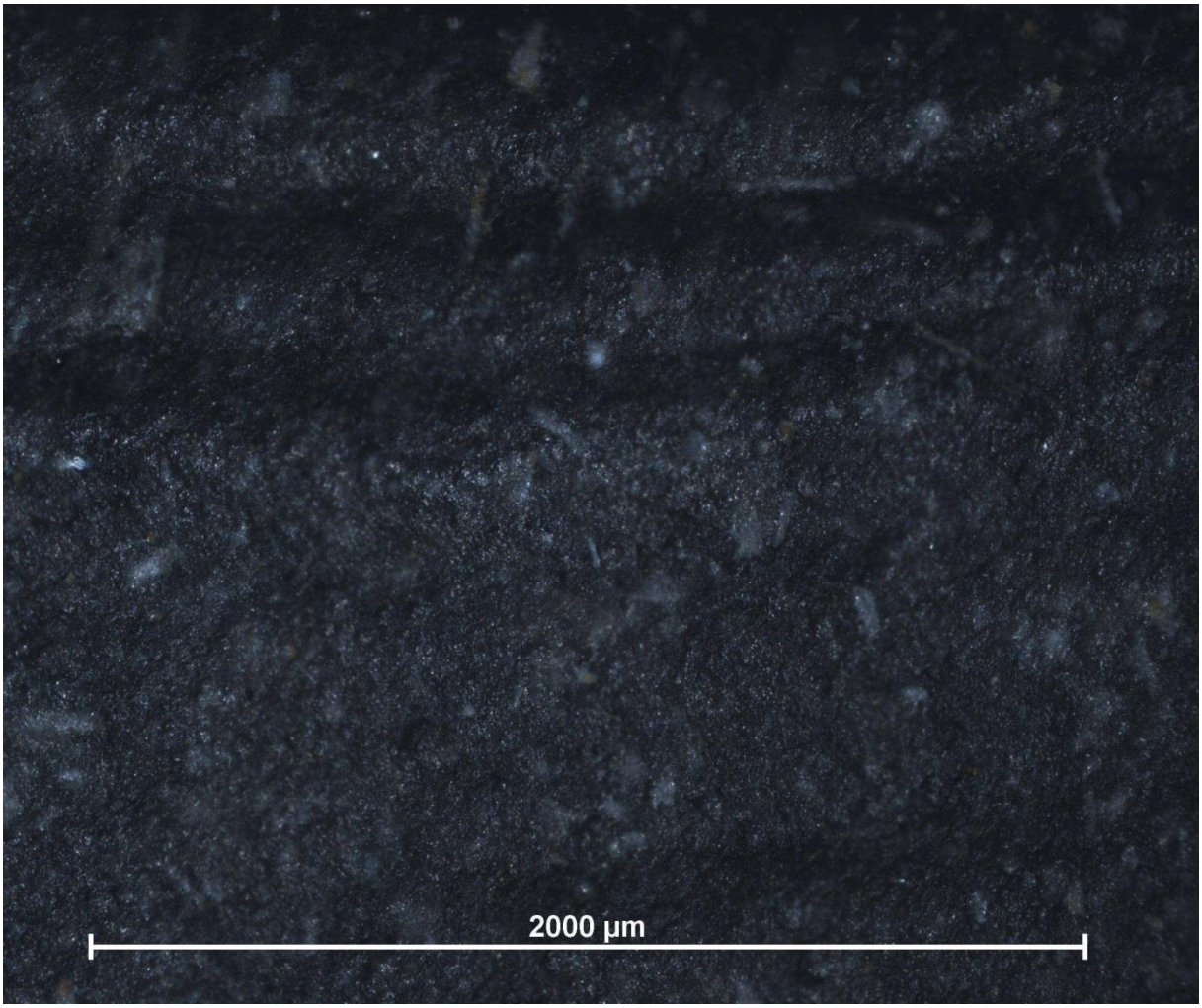

Figure 64. Chip, find no. 219, before conservation - image from the Nikon Eclipse LV 150 N microscope

7.20. Equal-armed brooch, find no. 221

Item	Equal-armed brooch
Inv . No.	221
Site	Aska East Cemetery 2020
Dimensions [cm]	1.48 (diameter) x 1.74 (height) x 0.26 (pin diameter) x 0.10 (plate thickness)
Weight [g]	4,699
Raw material	Cu allow
Procedure	no. 1

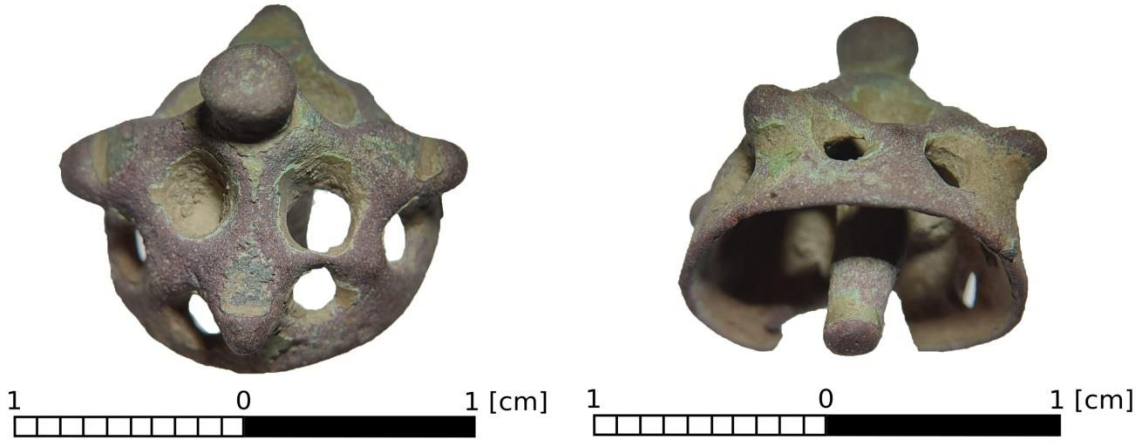

Figure 65. Equal-armed brooch, find no. 221, before conservation

Figure 66. Equal-armed brooch, find no. 221, after conservation

7.21. Sheet, find no. 222

Item	Sheet
Inv . No.	222
Site	Aska East Cemetery 2020
Dimensions [cm]	2,12 x 2,12 x 0,05
Weight [g]	1,217
Raw material	Cu allow
Procedure	no. 1

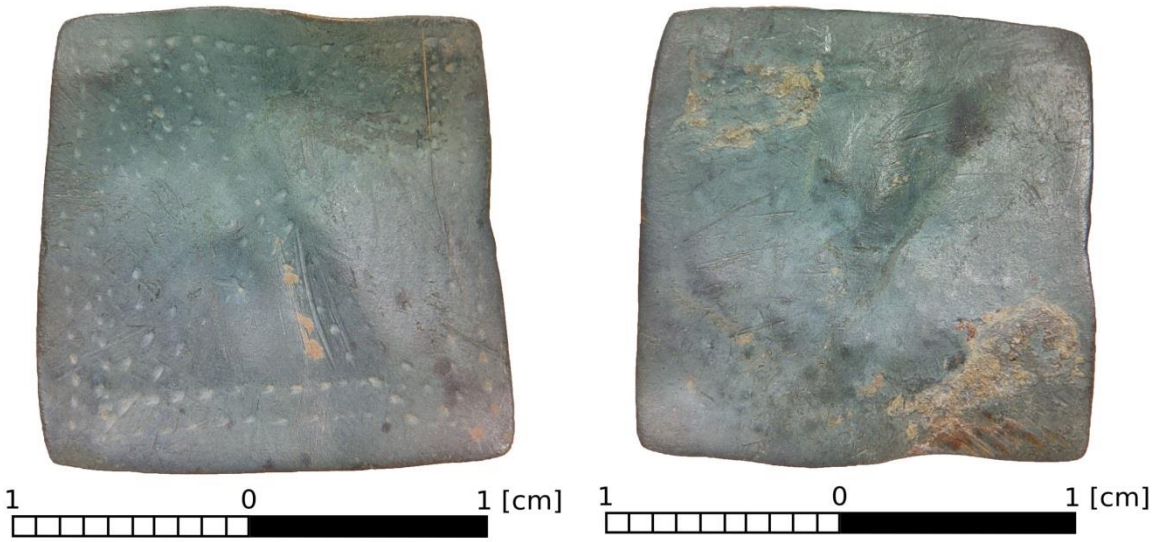

Figure 67. Sheet, find no. 222, before conservation

Figure 68. Sheet, find no. 222, after conservation

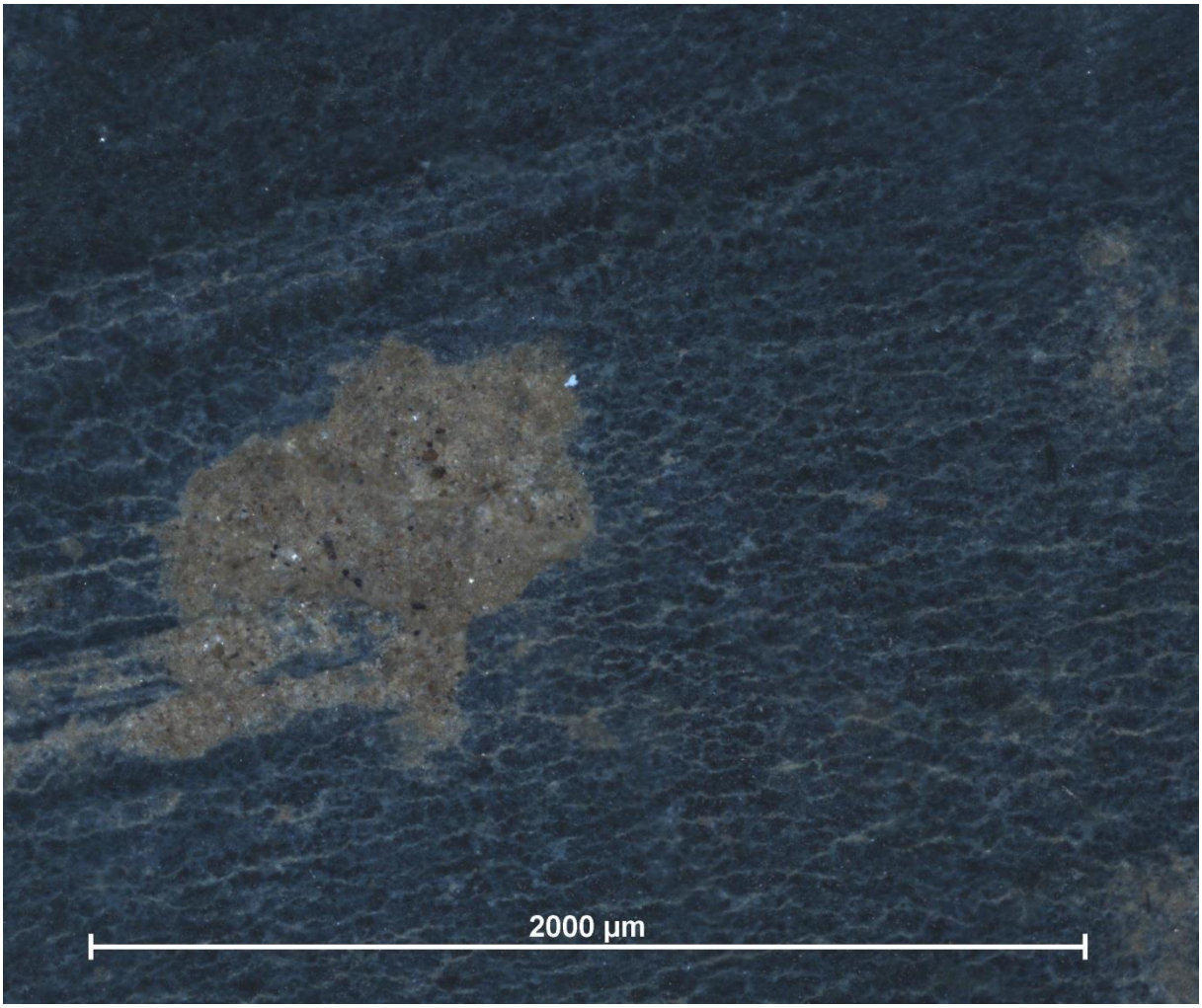

Figure 69. Sheet, find no. 222, before conservation - image from the Nikon Eclipse LV 150 N microscope

7.22. Tortoise brooch, find no. 223

Item	Tortoise brooch
Inv . No.	223
Site	Aska East Cemetery 2020
Dimensions [cm]	4.25 x 2.63 x 0.12 (plate thickness)
Weight [g]	10,837
Raw material	Cu allow
Procedure	no. 1

Figure 70. Tortoise brooch, find no. 223, before conservation

Figure 71. Tortoise brooch, find no. 223, after conservation

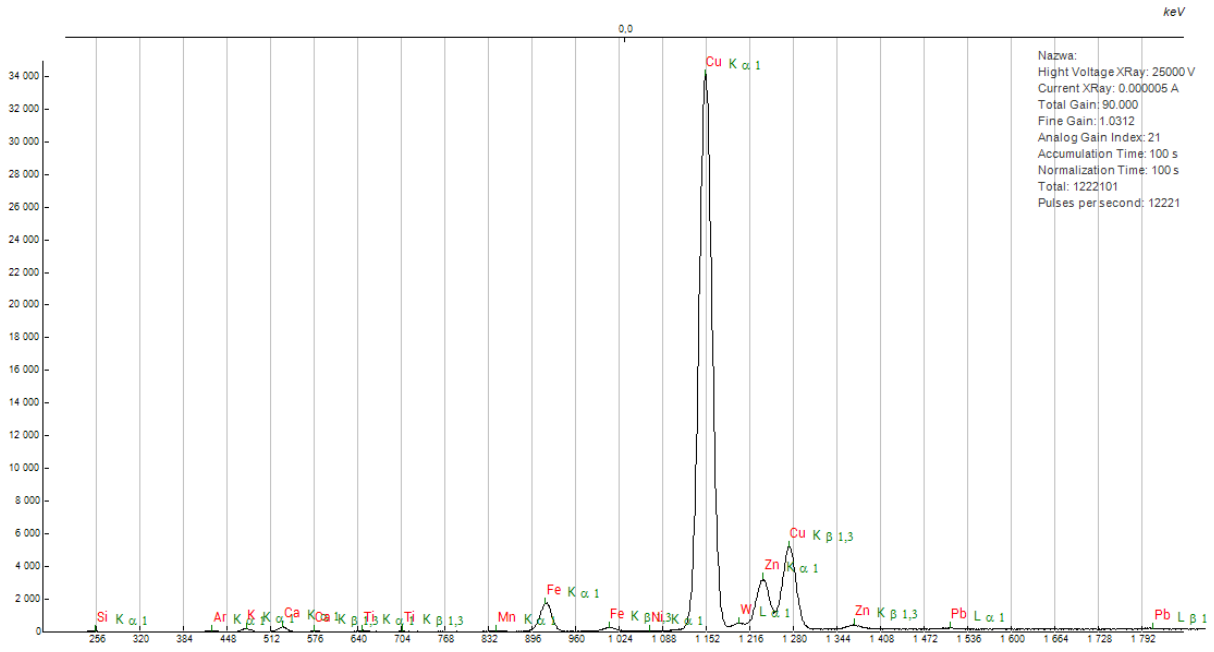

Figure 72. Tortoise brooch, find no. 223 - spectrogram

7.23. Tortoise brooch, find no. 224

Item	Tortoise brooch
Inv . No.	224
Site	Aska East Cemetery 2020
Dimensions [cm]	3.40 x 2.32 x 0.09
Weight [g]	3,891
Raw material	Cu allow
Procedure	no. 1

Figure 73. Tortoise brooch, find no. 224, before conservation

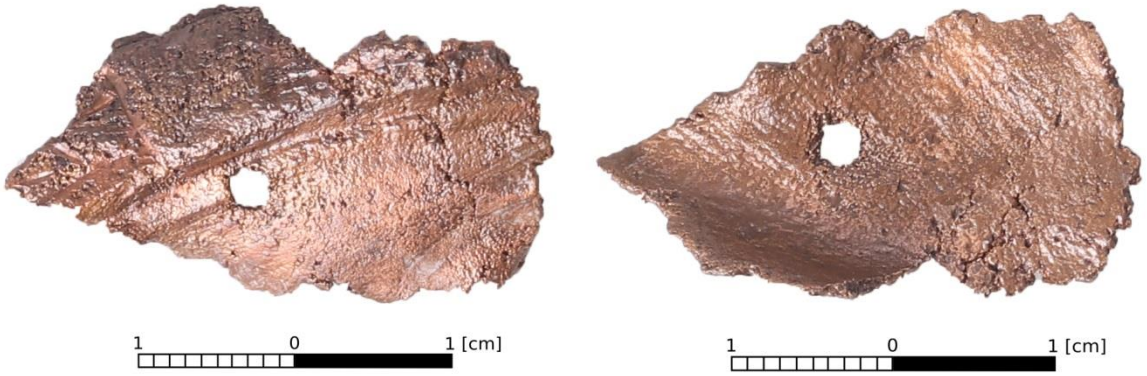

Figure 74. Tortoise brooch, find no. 224, after conservation

7.24. Knob, find no. 225

Item	Knob
Inv . No.	225
Site	Aska East Cemetery 2020
Dimensions [cm]	2.94 (length) x 1.06 (head diameter) x 0.24 x 0.43 (spindle cross-sectional dimensions)
Weight [g]	7,371
Raw material	Cu allow
Procedure	no. 1

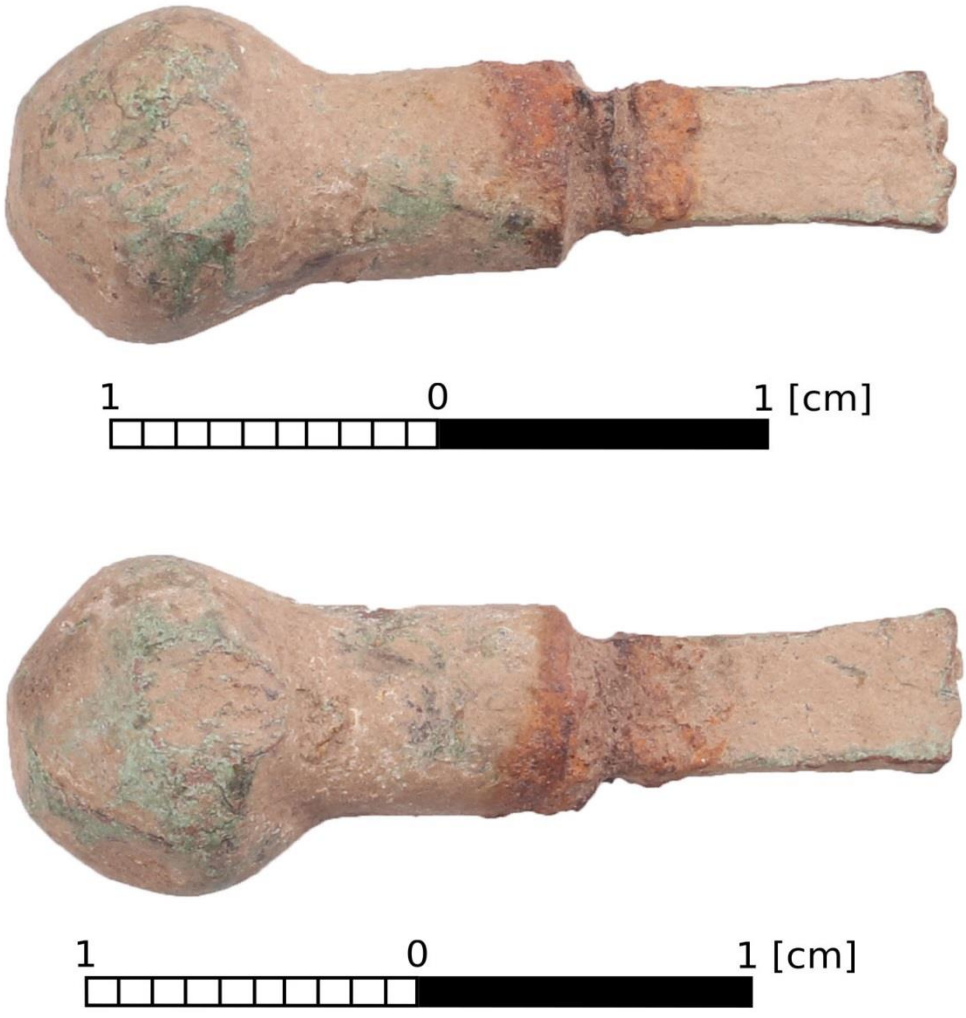

Figure 75. Knob, find no. 225, before conservation

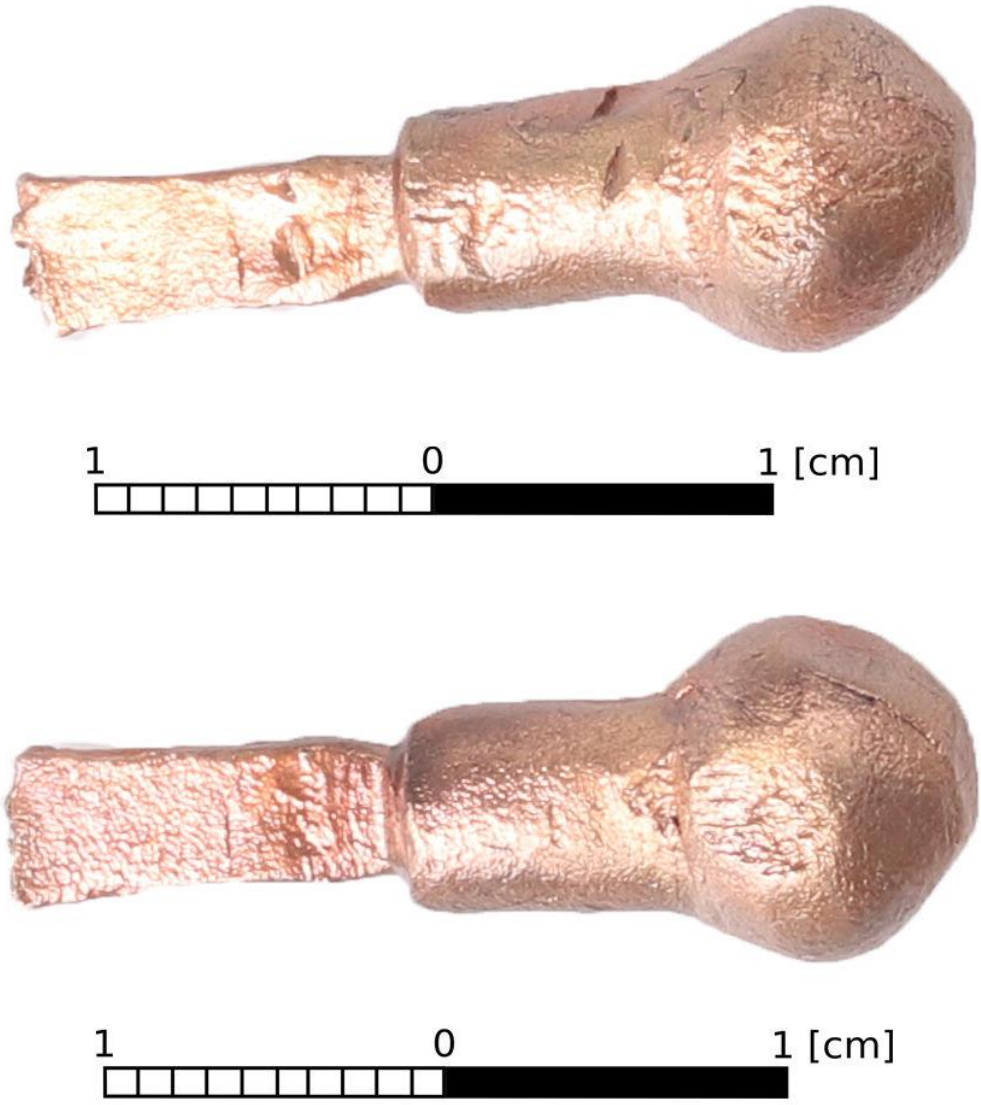

Figure 76. Knob, find no. 225, after conservation

7.25. Unidentified, find no. 226

Item	?
Inv . No.	226
Site	Aska East Cemetery 2020
Dimensions [cm]	length 1.88; width 1.98; maximum thickness 0.4
Weight [g]	2,273
Raw material	Sn&Pb alloy
Procedure	no. 3

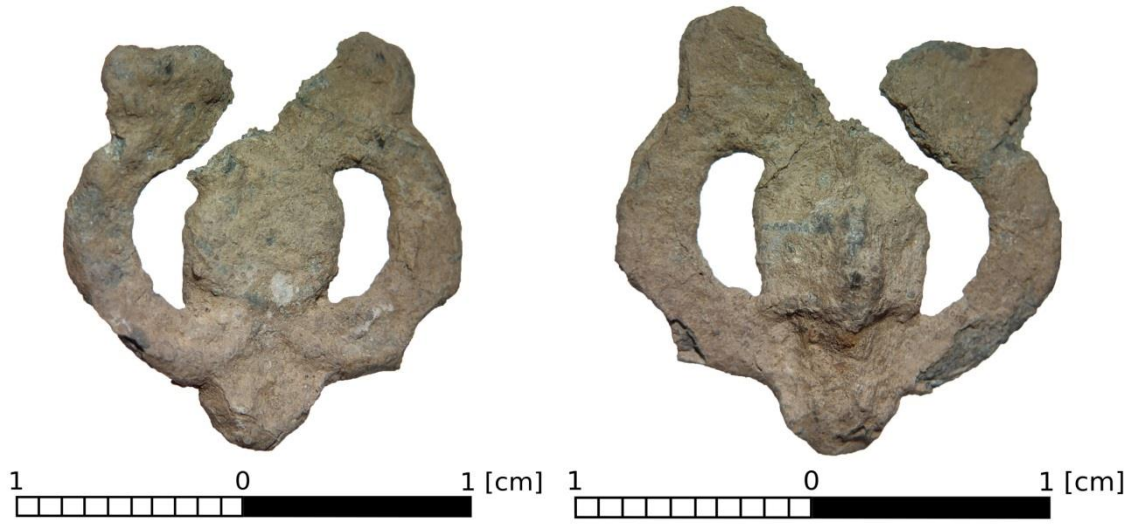

Figure 77. ?, find no. 226, before conservation

Figure 78. ?, find no. 226, after conservation

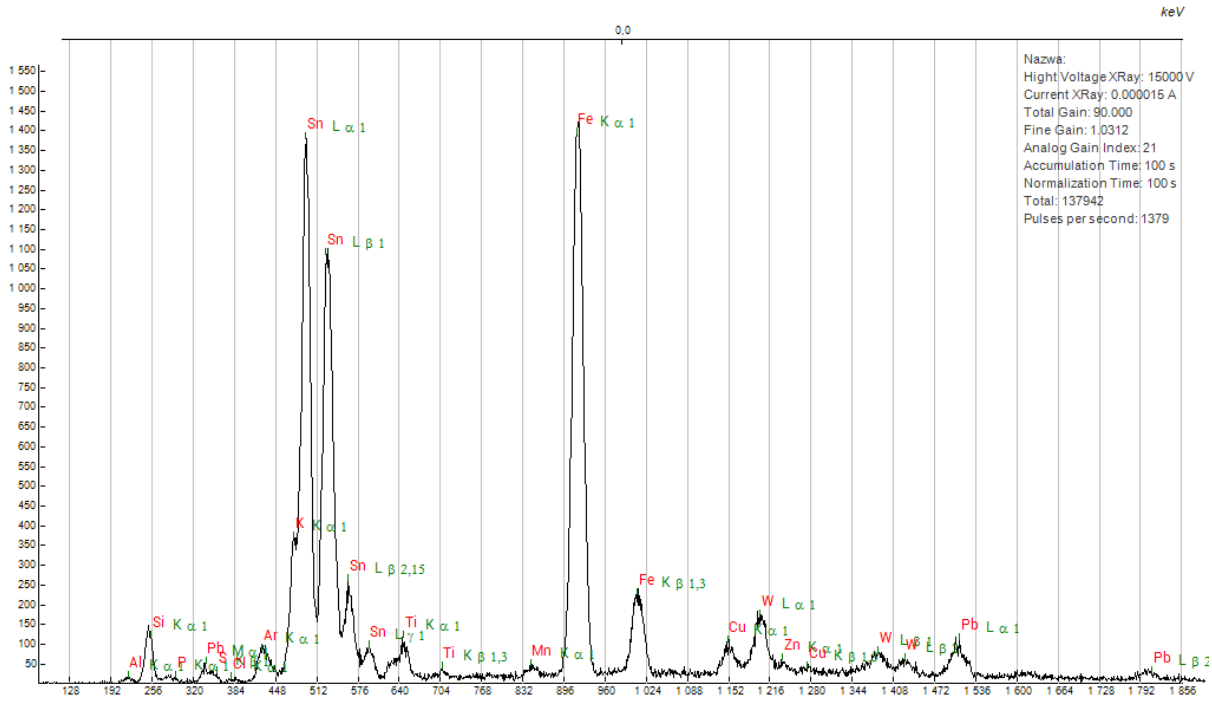

Figure 79. ?, find no. 226 - spectrogram

7.26. Tortoise brooch, find no. 227

Item	Tortoise brooch
Inv . No.	227
Site	Aska East Cemetery 2020
Dimensions [cm]	2.19 x 1.70 x 1.33 x 0.16 (plate thickness)
Weight [g]	4,033
Raw material	Cu allow
Procedure	no. 1

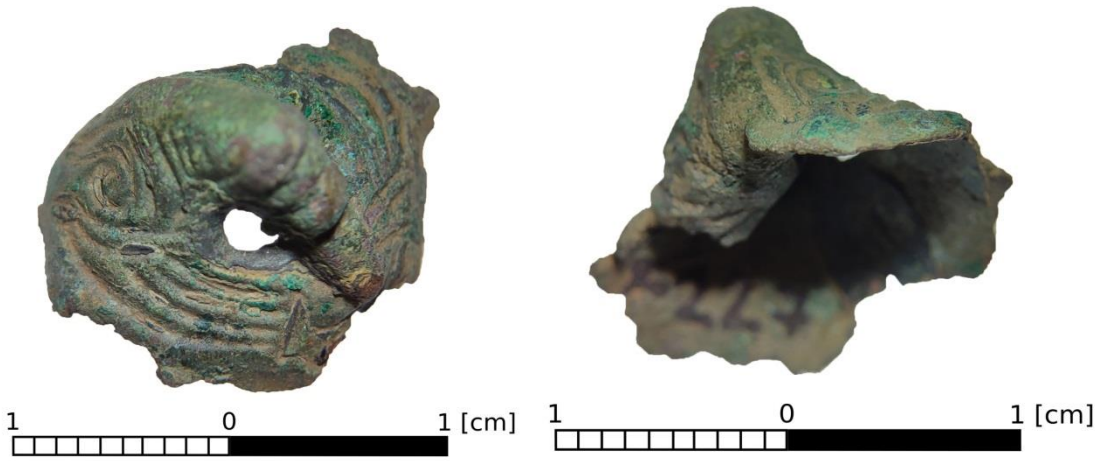

Figure 80. Tortoise brooch, find no. 227, before conservation

Figure 81. Tortoise brooch, find no. 227, after conservation

7.27. Strap end, find no. 228

Item	Strap end
Inv . No.	228
Site	Aska East Cemetery 2020
Dimensions [cm]	length 2.90; width 1.16; maximum thickness 0.52; plate thickness 0.04
Weight [g]	2,853
Raw material	Cu allow
Procedure	no. 1

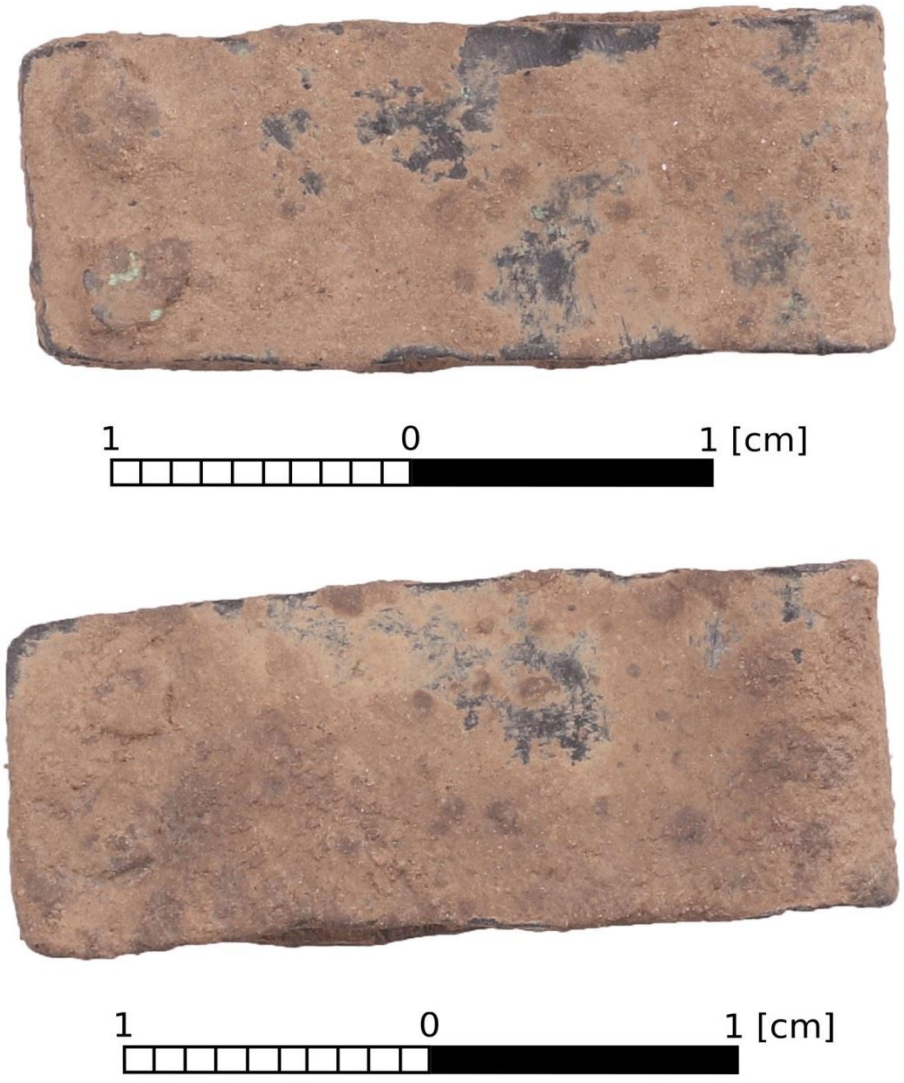

Figure 82. Strap end, find no. 228, before conservation

Figure 83. Strap end, find no. 228, after conservation

7.28. Unidentified, find no. 229

Item	?
Inv . No.	229
Site	Aska East Cemetery 2020
Dimensions [cm]	height 1.22; width 1.0; plate thickness 0.02
Weight [g]	0,187
Raw material	Cu allow
Procedure	no. 1

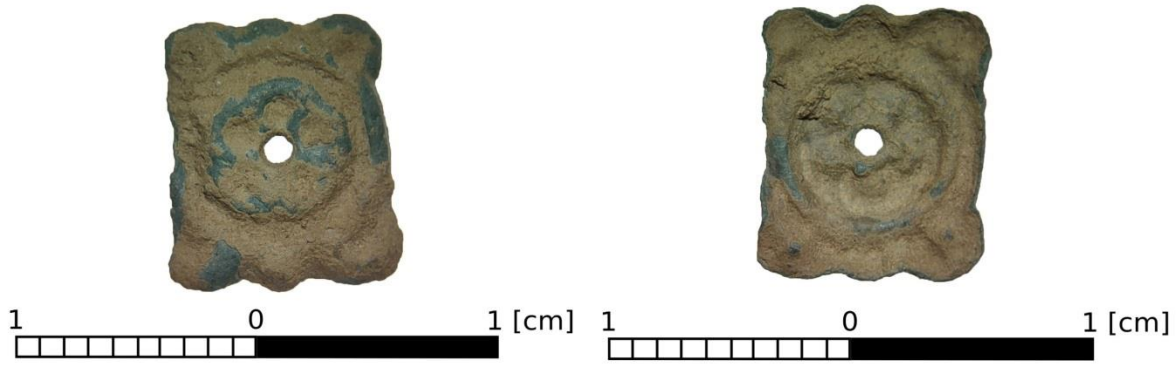

Figure 84. ?, find no. 229, before conservation

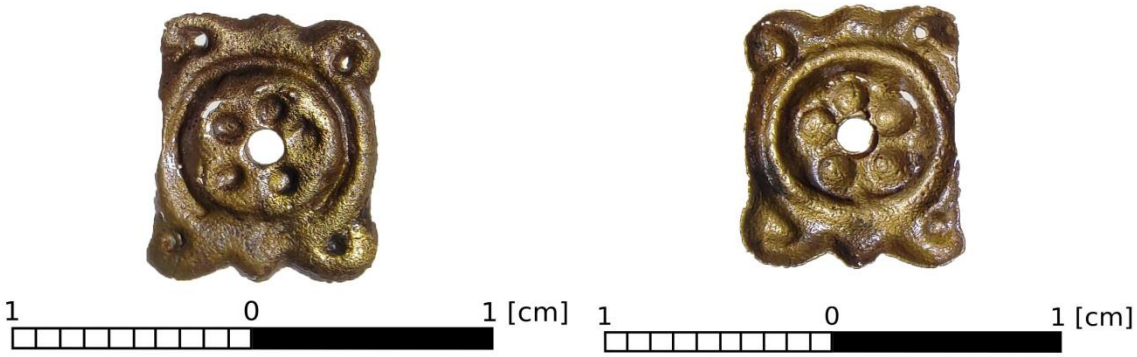

Figure 85. ?, find no. 229, after conservation

7.29. Double fitting, find no. 230

Item	Double fitting
Inv . No.	230
Site	Aska East Cemetery 2020
Dimensions [cm]	height 2.40; width 1.54; maximum thickness 0.55
Weight [g]	2,271
Raw material	Cu allow
Procedure	no. 1

Figure 86. Double fitting, find no. 230, before conservation

Figure 87. Double fitting, find no. 230, after conservation

7.30. Tortoise brooch, find no. 231

Item	Tortoise brooch
Inv . No.	231
Site	Aska East Cemetery 2020
Dimensions [cm]	1.93 x 1.54 x 0.09
Weight [g]	1,472
Raw material	
Procedure	

Figure 88. Tortoise brooch, find no. 231, before and after conservation

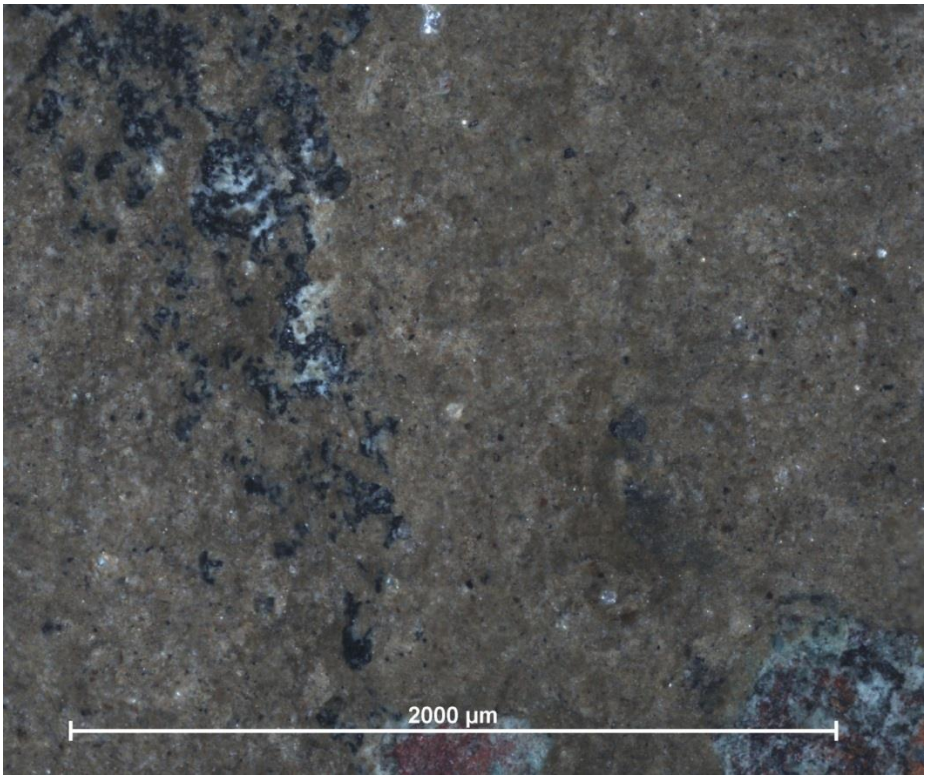

Figure 89. Tortoise brooch, find no. 231, before conservation - image from the Nikon Eclipse LV 150 N microscope

7.31. Unidentified, find no. 232

Item	?
Inv . No.	232
Site	Aska East Cemetery 2020
Dimensions [mm]	length 1.04; width 1.03; thickness 0.1
Weight [g]	0,506
Raw material	Cu allow
Procedure	no. 1

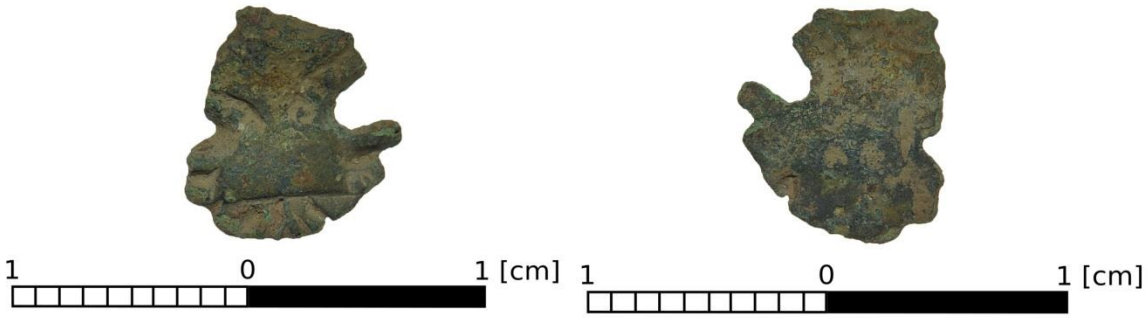

Figure 90. ?, find no. 232, before conservation

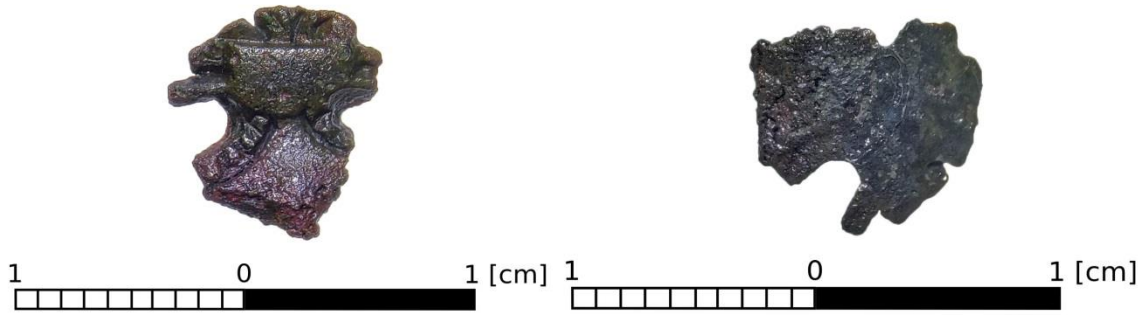

Figure 91. ?, find no. 232, after conservation

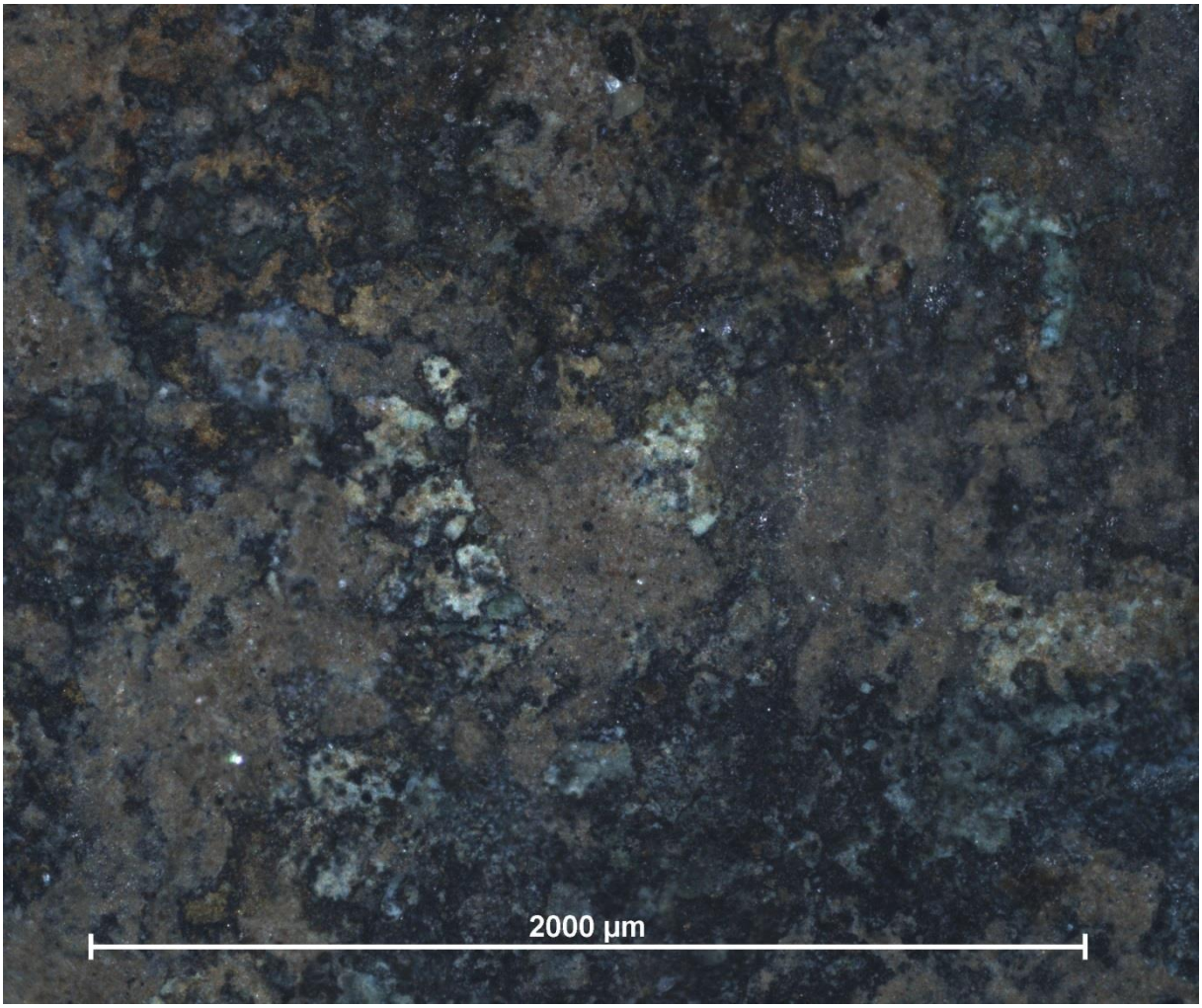

Figure 92. ?, find no. 232, before conservation - image from the Nikon Eclipse LV 150 N microscope

7.32. Unidentified, find no. 233

Item	?
Inv . No.	233
Site	Aska East Cemetery 2020
Dimensions [cm]	length 3.48; width 0.92; thickness 0.17
Weight [g]	2,826
Raw material	Cu allow
Procedure	no. 1

Figure 93. ?, find no. 233, before conservation

Figure 94. ?, find no. 233, after conservation

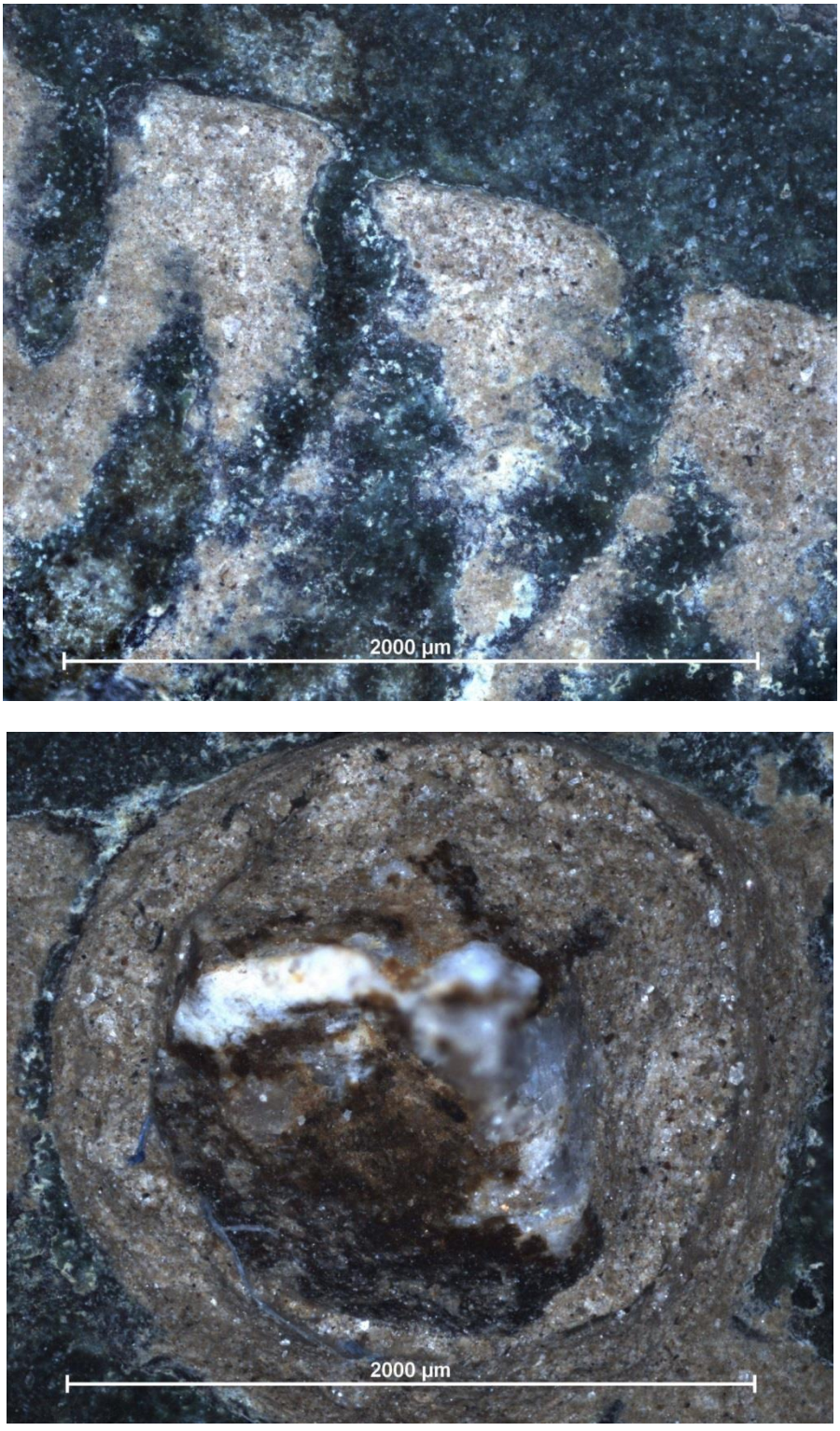

Figure 95. ?, find no. 233, before conservation - image from the Nikon Eclipse LV 150 N microscope

7.33. Disc-on-bow brooch, find no. 234

Item	Disc-on-bow brooch
Inv . No.	234
Site	Aska East Cemetery 2020
Dimensions [mm]	length 27.7; width 13.8; height 11.2; thickness 1.4
Weight [g]	3,337
Raw material	Cu alloy + Sn alloy
Procedure	no. 1

Figure 96. Disc-on-bow brooch, find no. 234, before conservation

Figure 97. Disc-on-bow brooch, find no. 234, after conservation

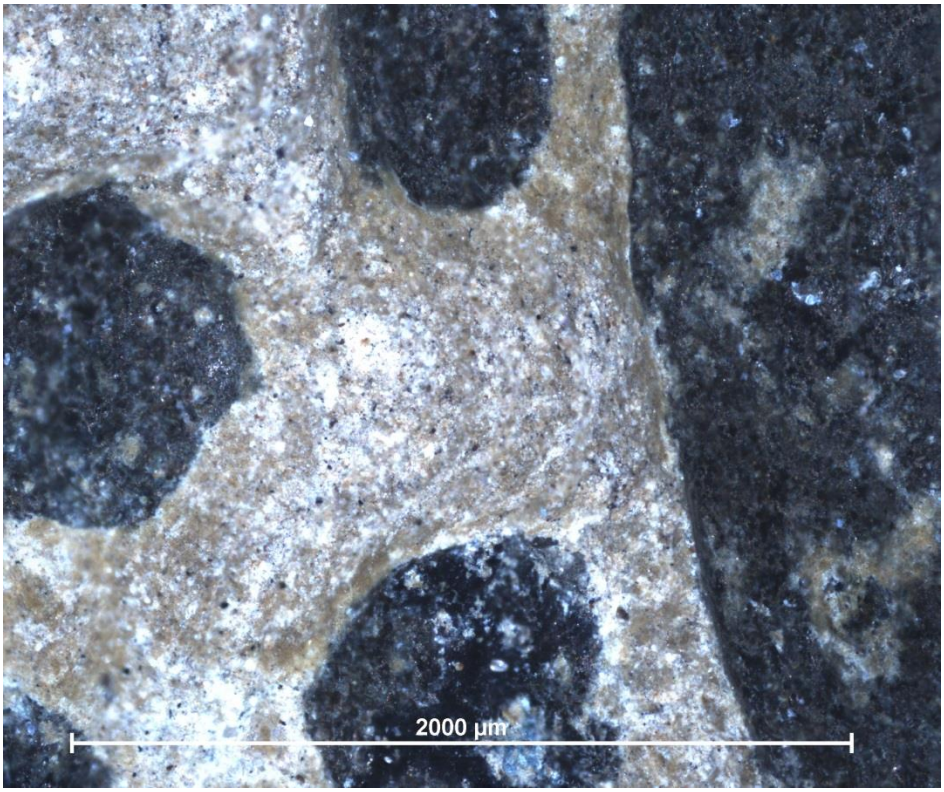

Figure 98. Disc-on-bow brooch, find no. 234, before conservation - image from the Nikon Eclipse LV 150 N microscope

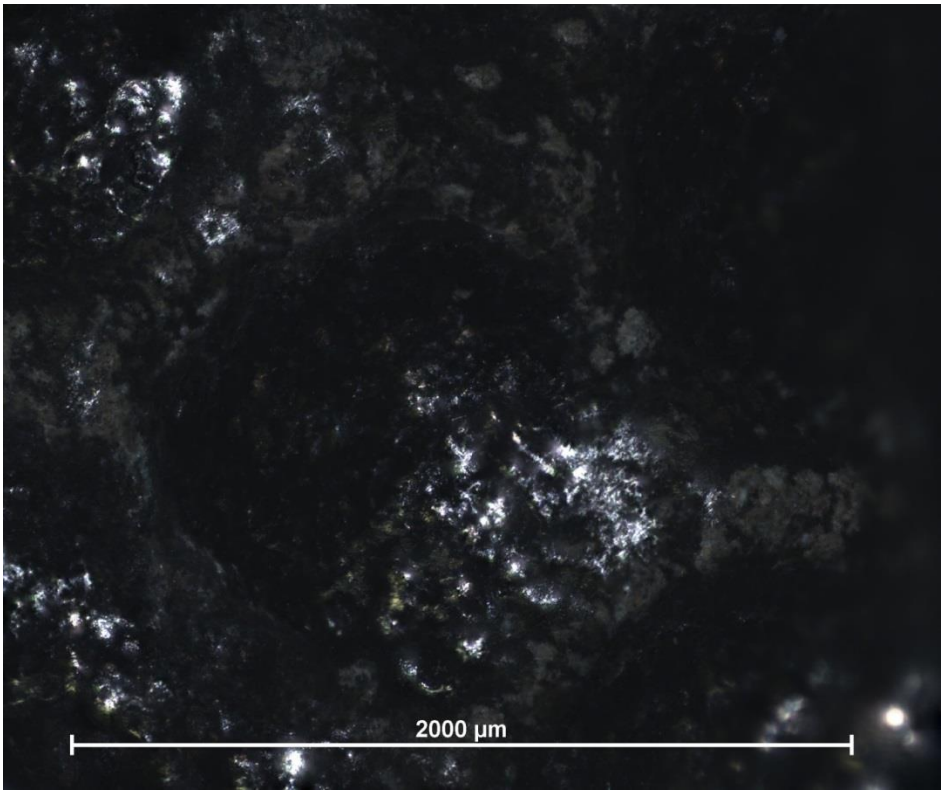

Figure 99. Disc-on-bow brooch, find no. 234, after conservation - image from the Nikon Eclipse LV 150 N microscope

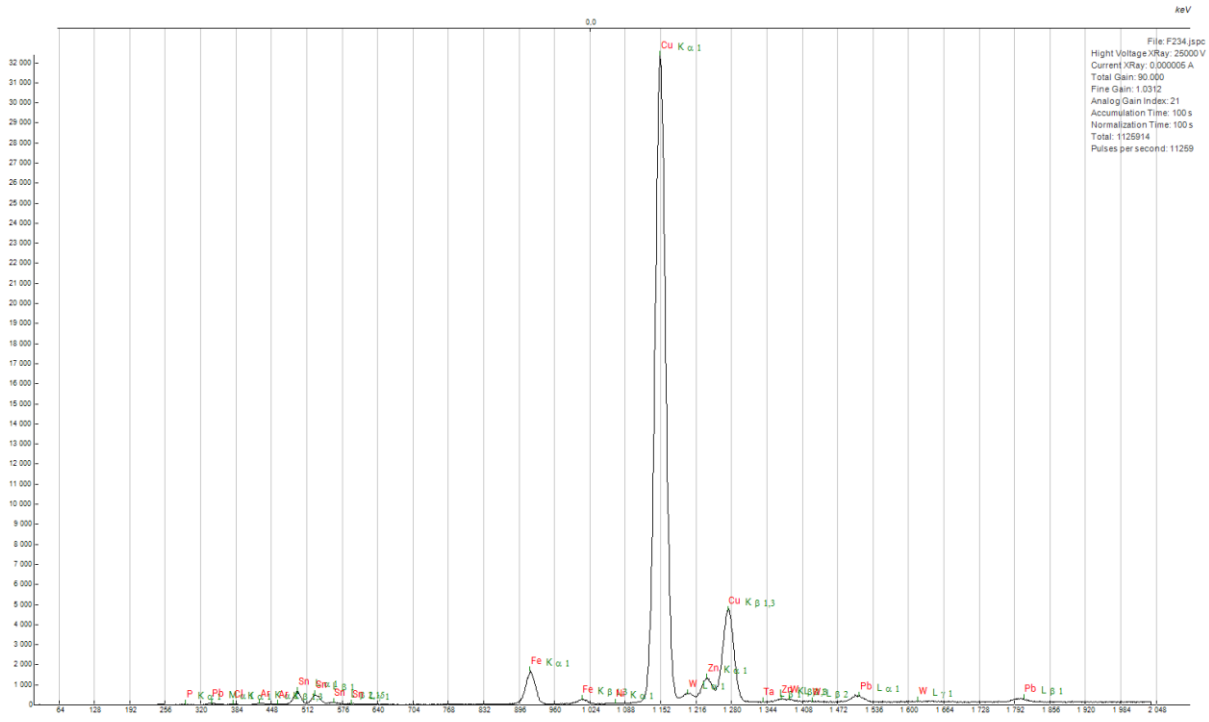

Figure 100. Disc-on-bow brooch, find no. 234 - spectrogram

7.34. Strap fitting, find no. 235

Item	Strap fitting
Inv . No.	235
Site	Aska East Cemetery 2020
Dimensions [cm]	length 1.12; width 1.40; plate thickness 0.05
Weight [g]	1,162
Raw material	Cu alloy
Procedure	no. 1

Figure 101. Strap fitting, find no. 235, before conservation

Figure 102. Strap fitting, find no. 235, after conservation

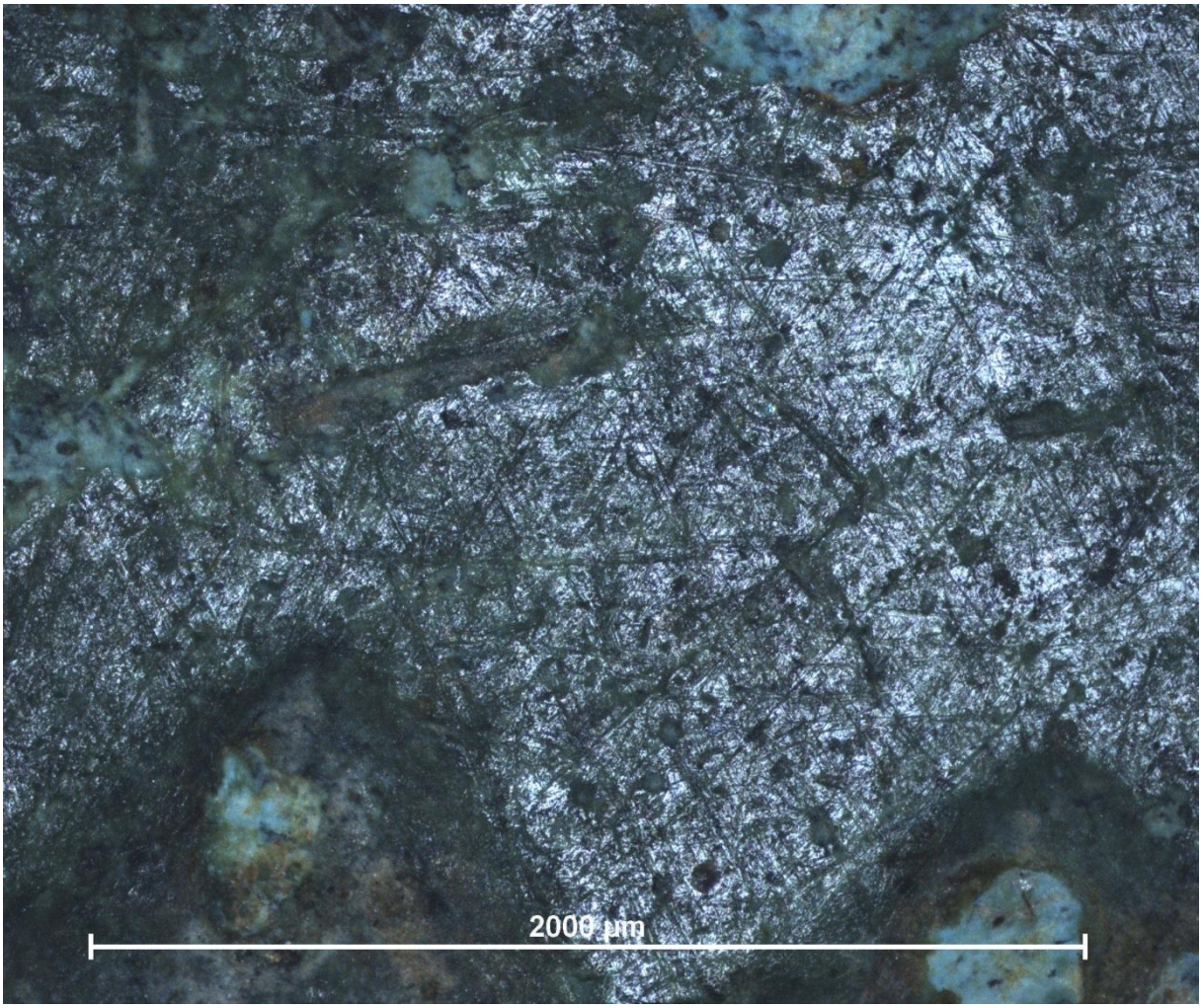

Figure 103. Strap fitting, find no. 235, before conservation - image from the Nikon Eclipse LV 150 N microscope

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